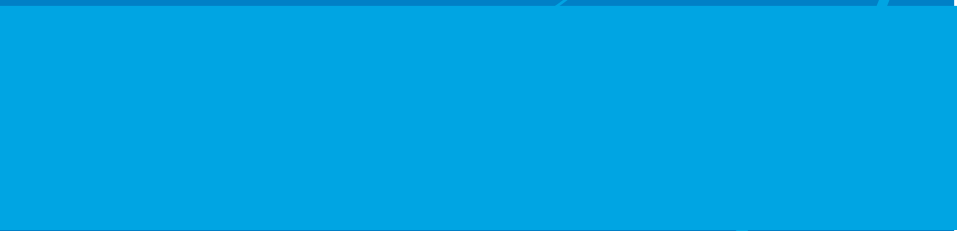Human Development Sector Reports
East Asia and the Pacific Region
The World Bank

CAMBODIA

Quality Basic Education For All

January 2005

CAMBODIA

QUALITY BASIC EDUCATION FOR ALL

Human Development Sector Unit
East Asia and the Pacific Region
The World Bank

January 2005

CURRENCY EQUIVALENTS
(Exchange Rate Effective end January 2005)

Currency Unit	=	Riel
Riel 3835	=	US$1
US$1	=	Riel 0.00026

FISCAL YEAR
January 1   –   December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank	LMC	Local Management Committee
BTC	Belgian Technical Cooperation	LSS	Lower Secondary School
CAS	Country Assistance Strategy	MDG	Millennium Development Goal
CCLS	Cambodia Child Labor Survey	MoEYS	Ministry of Education, Youth and Sports
CCT	Conditional Cash Transfer	NGO	Non-Governmental Organization
CR	Cambodian Riels	NIS	National Institute of Statistics
DHS	Demographic and Health Survey	NPRS	National Poverty Reduction Strategy
ECD	Early Childhood Development	OLS	Ordinary Least Squares
EFA	Education for All	PAP	Priority Action Program
EMIS	Education Management Information System	PETS	Public Expenditure Tracking Survey
ESP	Education Sector Plan	RGC	Royal Government of Cambodia
ESSP	Education Sector Support Program	SDP	School Development Plan
EQIP	Education Quality Improvement Project	SEDP	Socio-Economic Development Plan
GDP	Gross Domestic Product	SES	Socio-Economic Survey
HSES	Household Socio-Economic Survey	SFP	School Feeding Program
IFAPER	Integrated Fiduciary Assessment and Public Expenditure Review	TTC	Teacher training college
ILO	International Labor Organization	UNICEF	United Nations Children's Fund
IPEC	International Program on the Elimination of Child Labor	UPE	Universal Primary Education
JFPR	Japan Fund for Poverty Reduction	WFP	World Food Program
KAPE	Kampuchean Action for Primary Education		

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MINISTRY OF EDUCATION YOUTH AND SPORT

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FOREWORD

Following the expulsion of the Khmer Rouge from Cambodia in 1979, a government with severely limited human and material resources and restricted access to international aid commenced the process of rebuilding a shattered economy and education system. With the Paris Peace Accords of 1991 and the restoration of free elections in 1993, international aid began to flow into Cambodia.

By the mid-nineties various UN agencies had commenced the development of the statistical databases needed to inform policy development and the planning of informed and targeted policy interventions. Particularly important for Education were the national census, the development of an Education Management Information System (EMIS) and the commissioning of a series of household socio-economic surveys.

By the turn of the century the Education Ministry had commenced the series of Education Strategic Plans (ESP) which continue rolling over on an annually adjusted and periodic review basis. The Ministry commenced systematic planning of major education reforms targeting universal primary and basic education, quality improvement and the role of education in poverty reduction. The institution of annual Priority Action Plan (PAP) budgets, of school feeding programs and cash support access programs for the children of the poor resulted in significant improvements in enrolments and pupil promotion rates.

Cambodia – Quality Basic Education for All provides a world standard and timely sophisticated statistical review of what has been achieved and what remains to be done.

Primary school enrolments have increased spectacularly so that the Ministry is now in the process of constructing 800 new lower secondary schools. A large portion of the enrolment increase comes for the recovery of overage school leavers. Transition rates beyond grade 3 are a challenge for many poor communities and this is an area of intervention that could enable all children to take advantage of emerging opportunities in secondary education.

Demand side interventions have considerably reduced the high private costs of public education of the late nineties but costs to parents still constitute a barrier to continuing public school access. The opportunity cost of education, of income foregone from domestic and productive work, also hinders initial enrolment and retention.

The chapter on "Lessons from Policy Interventions in Cambodia" provides valuable evidence on which reforms have worked well and how the policies might be better targeted. Investments in teacher development have a marked impact on pupil participation and particularly on test performance. Scholarships for poor girls have resulted in attracting more to enter Grade 7.

In December 2004 the results of the study were presented to a stakeholders workshop in Phnom Penh to review the new Education Sector Support Program 2004-08. The availability of this new information was greeted with considerable interest.

On behalf of the Royal Government of Cambodia I thank the World Bank for its initiative in commissioning the various contributory studies and in assembling this valuable overview of the state of basic education in Cambodia. The results of the study will inform further improvements in Cambodian education planning for continuing reform.

Pok Than
Secretary of State
17.03.05

EXECUTIVE SUMMARY

1. CONTEXT

The diversification and deepening of the country's low human resource base are central to the Royal Government of Cambodia's (RGC) strategy to promote new and sustainable sources of economic growth as well as improved living standards. To this end, the Government has committed to advancing its education sector. It recognizes that any effort to improve the education base of the country must start from the bottom, that is, by providing quality basic education for all. This realization is reflected in the Government's education sector program, which has affected positive change including a marked increase in primary net enrollment rates. Despite improvements, however, the Government faces formidable challenges in consolidating and furthering these gains towards achieving quality basic education for all. To address these challenges, the Ministry of Education, Youth, and Sport (MoEYS) has recently revised its Education Strategic Plan (ESP) 2004/2008.

This report aims to contribute and inform the ongoing debate on policy options by providing a comprehensive empirical analysis of the role of demand- and supply-side factors and policy interventions in facilitating access to, completion of, and learning in basic education, especially for the most disadvantaged children. The report is divided into three main parts. The first part presents a profile of the basic education sector. The second part provides a general characterization of how demand and supply factors are related to student outcomes, and draws policy implications from the results. The third part exploits the valuable lessons from past and ongoing demand- and supply-side interventions in Cambodia. The report and its findings highlight the importance of exploiting all existing sources of education data, and conducting rigorous impact evaluations of key strategic policy interventions for future education policy and planning.

2. A PROFILE OF THE BASIC EDUCATION SECTOR

Cambodia's primary net enrollment rates have increased significantly in recent times but access is still far from universal. Overage enrollment is pervasive in basic education and is primarily due to late school entry. Late school entry is not a temporary phenomenon but is strongly related to structural factors. Most of the recent gain in primary net enrollment rates is due to a net gain in the proportion of children that enter school, most of whom are over age, rather than children staying longer in school. In other words, there has not been any significant change in school progress. A severe bottleneck in the basic education sector begins in upper primary education. While most children spend some time in primary school, significant numbers drop out before completing the primary school cycle. This decline in participation through the years of basic education is particularly severe among children from households in the poorest two wealth quintiles. There are also enrollment differences by gender and

A severe bottleneck in the basic education sector begins in upper primary education.

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geographic area. Thus, the attainment of Universal Basic Education will require addressing the bottleneck in upper primary school and focusing on interventions that promote equitable access and participation.

3. STUDENT OUTCOMES AND SCHOOL INPUTS

One of the education sector's most significant challenges is to keep children, particularly poor children, in school beyond the first few grades of primary school. The question then emerges: what drives student dropout and what policies can be instituted to stem it?

Policies that attract children to school at the proper enrollment age are key to reducing primary school dropout. To achieve this, and to reduce dropout rates more generally, efforts are needed to increase school readiness early on through the provision of, for example, pre-school education. To improve early access to and progress through primary school, "completing" all primary schools in a cost-effective manner is essential. Raising the expectation of schooling opportunities beyond primary education, in the form of lower secondary school (LSS) availability, is also critical: It has been shown to increase early access to school and reduce primary school dropout. The availability of health-related facilities (drinking water, latrines) and learning facilities (libraries) is also important in keeping children in school.

Policies that attract children to school at the proper enrollment age are key to reducing primary school dropout.

The quality of teachers as measured by education level, is another key factor that assists in the retention of children in primary school. Teachers' educational backgrounds and pre-service training are very diverse and unevenly distributed across Cambodia. The availability of teacher education and training programs is limited and the quality of pre-service training is low: current teacher education programs have limited relevance to classroom practice and teacher trainers are inadequately prepared.

The quality of teachers as measured by education level, is another key factor that assists in the retention of children in primary school.

The availability of complementary inputs that enhance the performance of teachers increases early access to and progress in primary school. Girls' dropout behavior tends to respond to school inputs in the same direction as boys but girls are more sensitive to them than boys. While school and teacher characteristics have a great impact on student outcomes at the primary level, these supply-side factors explain little of the variation in student outcomes across LSSs. Demand-side factors, which may serve to provide some explanation of these variations, are therefore explored.

4. SCHOOL AND WORK

Child work is widespread in Cambodia and begins at a very early age. The time devoted to work is significant and contributes a sizable amount to the livelihood of the household. This has potentially negative consequences on child health and schooling. As regards schooling, the value of child work generates an important indirect cost that outweighs all direct costs combined. Child work can potentially interfere with schooling by reducing the time available for school activities and diminishing school performance as a result of physical exhaustion.

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In this respect, the analysis demonstrates that the schooling, productive work, and domestic work activities of Cambodian children are strongly interrelated from a very early age. In fact, school and work activities are largely substitutes, particularly school and productive work. The trade-off or degree of substitution between school participation and productive work increases rapidly as the child gets older. This is especially true for girls aged 15-17 whose schooling is more likely to be displaced by productive work than that of boys of the same age. However, a strong negative relationship between school and work is already apparent at a very early age. In particular, beyond the association between work and school dropout work tends to cause a delay in school entry and may prevent entry altogether. This is especially the case in relation to productive work amongst boys. This delay in school entry has, in turn, sizable negative consequences on the subsequent schooling experience of children, particularly girls.

The results presented here suggest that school incentive schemes that provide cash or in-kind subsidies to poor children, conditional on school attendance, offer a promising route. The effectiveness of such a demand incentive scheme would, furthermore, be greatly increased if accompanied by efforts to improve the adverse environment faced by working children.

5. PRIVATE DIRECT COSTS OF BASIC EDUCATION

Although household direct costs have been reduced after the introduction of the Priority Action Program (PAP) in 2000, they remain substantial, particularly in the form of pocket money, transportation expenses, and supplementary tutoring. Especially in the last grade of each level, household costs per student increase rapidly with grade. The greatest proportional increase in costs, however, is observed in the transition between primary school and LSS.

Household direct costs remain substantial, particularly in the form of pocket money, transportation expenses, and supplementary tutoring.

Household costs are much larger in urban areas than in rural areas. Supplementary tutoring, which operates as a sort of shadow system alongside the mainstream, consumes considerable household resources, especially in urban areas and in key final grades. Supplementary tutoring is closely linked to the poor working conditions of most teachers. Thus, for policy changes on tutoring to be effective, they must come hand-in-hand with changes in teacher remuneration.

Cambodian households bear heavy education burdens that necessitate further efforts to reduce cost barriers. On the whole, private contributions to education are likely to remain an important source of revenue in this under-resourced environment. Basic education cost-sharing, however, should be strictly on a voluntary basis so as not to have a deleterious effect among more economically disadvantaged children. Direct and indirect household costs reinforce each other to produce a critical barrier for the poor in upper primary and going into LSS.

6. PRIVATE BENEFIT OF BASIC EDUCATION

There are large private returns to education in terms of both current labor market outcomes and employment-related outcomes. Labor market outcomes are represented by wages and earnings while employment-related outcomes include paid employment, working in the wage sector, and holding a permanent job. These returns reflect the scarcity of educated workers at even low-level jobs and highlight the reason why there are such large returns to even primary school completion. Thus, while the current labor market opportunities for educated workers are limited, particularly in rural and remote areas, education carries a large premium.

7. LESSONS FROM POLICY INTERVENTIONS IN CAMBODIA

There has been a significant increase in the amount of public resources devoted to education in recent times, specifically recurrent expenditures in the basic education sector. This increase corresponds with a major shift in the education sector strategy of the Government, as operationalized through the Priority Action Program. PAP shifted the focus of education policy towards demand-side factors. Overall, PAP basic education package has played an important role in the improvement of primary net enrollment rates. This improvement is largely due to the removal of school fees and the provision of school operational budgets. The effectiveness of PAP has been impaired by problems of cash flow. Disbursements have been low and schools report payment delays from the provincial treasury. A comprehensive analysis of the flow of PAP operational budget funds from the Ministry of Economy and Finance down to primary schools is underway as part of the Public Expenditure Tracking Survey (PETS). In most cases, school operational budgets have been utilized as intended, but schools report a lack of flexibility in using funds to address specific local needs. Most teachers consider their school budget transparent and have been involved in the preparation of their School Development Plan (SDP) for using the school's operational budget. Most parents, on the other hand, are unfamiliar with this process.

In addition to PAP funds, primary schools in Takeo, Kampot, and Kandal provinces have received school cluster grants through the Education Quality Improvement Project (EQIP). A comprehensive evaluation of EQIP offers a good opportunity to learn about the cost-effectiveness of different quality improvement interventions. Overall EQIP has had a significantly positive effect on student outcomes: each additional year of participation in EQIP is associated with lower dropout rates, higher promotion rates, and higher test scores. Among all the different quality improvement interventions under the program, money invested in teacher development had the highest payoff in terms of student retention, promotion, and student learning, in particular. Cost-effectiveness calculations indicate that small amounts of money devoted to teacher training may have a large impact on learning. In terms of reducing student

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dropout, investments in health and vocational training also had a measurable effect. Investments in equipment, and classroom and school infrastructure were also important factors in improving promotion rates.

A new national scholarship scheme for lower secondary education has been set up. The scheme consists of three integrated components: the Government-financed PAP 12; the Asian Development Bank-financed Japan Fund for Poverty Reduction (JFPR/ADB) scholarship program for girls and ethnic minority children; and the scholarship component of the Belgian Technical Cooperation (BTC) education aid package. An inter-agency collaborative study is underway to evaluate the impact of the JFPR/ADB scholarship program and to analyze its targeting performance. Preliminary estimates indicate that the program has thus far had a modest positive impact on 7th grade girls' enrollment but no discernable effect on girls' grade 8 enrollment.

Unfortunately the pool of potentially eligible children for lower secondary scholarships is already a highly selected group from the initial population of children starting primary school. Efforts to retain children within the education system must begin earlier, before they drop out of the primary cycle. For example, the extension of demand-side incentives to at-risk upper primary children may deserve careful deliberation.

8. THE ONGOING PROGRAM FOR EDUCATIONAL REFORM

MoEYS has undertaken an ambitious reform agenda that has already began to bear fruit. The transformation of the basic education system in Cambodia in the past decade has been notable. But some important challenges remain. Moving into the future, MoEYS will need to begin to devote greater attention to the following three broad areas of action in order to fulfill its goal of universal quality basic education for all.

First, while it is important to provide increasing resources to LSS, this report finds that the bottleneck of the basic education system begins, not in LSS, but in upper primary school. Direct and indirect household costs reinforce each other to produce a critical barrier for the poor starting in upper primary and thus calling for emphasis not only on supply-side but also on demand-side interventions.

Second, late school entry is a pervasive and structural phenomenon with very negative consequences on primary school completion. Policies that attract children to school at the official entry age of 6 will be key to reducing primary school dropout. Also, additional efforts are needed to attend to the school readiness of children and the provision of preschool education.

Third, uprooting informal fees, such as those from supplementary tutoring, will require more comprehensive strategies as they are linked to broader civil service reform constraints. The ESSP has begun to address the low level of teacher pay by incorporating incentives for hardship posts

and remedial teaching. But these incipient steps must be articulated more clearly into a deeper teacher remuneration overhaul inclusive of teaching service conditions, minimum standards, and performance-based incentives within a sustainable budget framework.

INTRODUCTION: Background, Rationale, Objectives and Contents

After nearly three decades of armed conflict and political instability, Cambodia has made recent progress in stabilizing its economy, re-introducing greater market orientation, and restoring economic growth. Despite this progress, the challenges of ensuring sustained economic growth and poverty reduction remain. Recent economic growth has been generally robust. But, while the bulk of the economy continues to rely on subsistence agriculture, this growth has been confined to the garment and tourism sectors, both of which have uncertain future prospects. The benefits of this growth pattern have been both geographically and socially concentrated, deepening the inequalities between rich and poor and between urban centers and rural lands. This uneven distribution of growth across sectors, geography, and economic groups explains in part why such robust economic growth has resulted in only modest reductions in the poverty headcount.

The diversification and deepening of the country's low human resource base is pivotal to the Royal Government of Cambodia's (RGC) strategy to promote new and sustainable sources of economic growth and improve living standards. Evidence suggests that while Cambodia's low supply of skilled and educated workers is not a serious detriment to the country's current economic model, it may restrict the development of new sources of economic growth in the future. If the Cambodian economy is to gradually move towards the production of goods and services requiring higher skill content, immediate actions are needed to improve the availability and quality of education. Furthermore, given the scarcity of educated workers even at low levels, any effort to improve the education base of the country must begin at a fundamental level, that is, by providing quality basic education for all.

The commitment of the RGC to human development is reflected in the Socio-Economic Development Plan for 2001-2005 (SEDP II), the National Poverty Reduction Strategy (NPRS), and the Government's commitment to the localized Millennium Development Goals (MDGs) in relation to education and health. The Government's education sector program, led by the Ministry of Education, Youth and Sports (MoEYS), manifests two salient objectives:

- to achieve universal enrollment and completion of primary education, and increase access to and completion of lower secondary school to move towards universal completion of nine years of basic education; and
- to improve the quality of all nine years of basic education.

The policy and implementation framework for reaching these basic education goals are articulated in the Education Strategic Plan (ESP), the

Education Sector Support Program (ESSP), and the Education for All (EFA) Action Plan.

To help achieve these goals, the Government has devised twelve Priority Action Programs. Of particular relevance are PAP 1 - Education Service Efficiency; PAP 2 - Primary Education Quality and Efficiency; PAP 3 - Secondary Education Quality and Efficiency; and PAP 12 - Scholarships and Incentives for Equitable Access, a national program for improving access to lower secondary education for students from poor families.[1]

The highest priority has been given to increasing primary school enrollments with measures such as the provision of school operational budgets for routine expenses, the abolition of enrollment fees, and school-based learning remediation programs.

With an allocation of 10 billion Cambodian Riels (CR), PAP was first launched during the third quarter of 2000 in ten pilot provinces in support of PAP 2 (primary education). Since then, funding has increased to cover all twelve programs nationally, with a budget of CR 75 billion.[2] Overall, the highest priority has been given to increasing primary school enrollment through such measures as the provision of school operational budgets for routine expenses, the abolition of enrollment fees, and school-based learning remediation programs. The government has also launched a systematic program to decentralize education services and build institutional capacity at the provincial, district, cluster/commune, and school levels.

The past five years have seen progress in education reform. There has been notable expansion of access and improvement of quality, particularly in regard to primary net enrollment rates. Still, the ESSP and the Integrated Fiduciary Assessment and Public Expenditure Review (IFAPER) (World Bank and ADB, 2003) highlight a number of the challenges that remain:

- low access to basic education, particularly lower secondary schooling, among children from poor families, girls, ethnic minorities, and children living in remote areas;
- high dropout rates in basic education, with most of this dropout occurring in upper primary school before children have completed the full cycle; and
- uneven quality and standards in basic education.

A number of major demand- and supply-side constraints have been identified, including:

- the continuation of informal fees;
- the prevalence of incomplete schools, especially in poor and remote areas;

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[1] PAPs account for an estimated 20 percent of the total education budget and 28 percent of the recurrent budget. PAPs 1, 2, and 3 account for 57 percent of the total PAP budget.
[2] Late disbursement of the funds channeled through the PAPs has been a longstanding problem. A Public Expenditure Tracking Survey is underway to assess the flow of PAP funds from the central Government to schools.

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- limited infrastructure and capacity in lower secondary education, particularly in poor and remote areas; and
- poor professional standing of teachers in terms of compensation, professional development opportunities, autonomy/responsibility, and managerial/system support.

The MOEYS has recently revised its Education Strategic Plan (ESP) for 2004/2008. This process was informed by past findings and recommendations from annual ESSP reviews and from relevant sector studies. In addition, MoEYS has requested that international partners and the non-governmental organization (NGO) community contribute further analytical inputs to advise and inform the annual ESSP reviews. This report aims to address MoEYS' specific concerns as it considers alternatives for the next phase of Cambodia's educational development.

The recently approved Education Strategic Plan (MOEYS, 2004a) lays out policy priorities that diverge from previous policy formulations for basic education in three main respects:

- increased emphasis on demand-side interventions;
- increased emphasis on improving education quality; and
- increased focus on lower secondary education.

These policies include:

Demand-side interventions	To reduce cost barriers now limiting basic education access: • abolition of all informal/illegal payments in grades 1-9; and • provision of scholarships for the very poor in grades 7–9
Supply-side interventions	To increase the quantity and quality of school inputs and improve service delivery in basic education: • phasing out of incomplete primary schools; • expansion of lower secondary school facilities; • provision of school operating budgets (linked to the abolition of informal/illegal fees); • development of remedial classes; • improvement of school readiness; • increased provision of core instructional materials; • increased deployment of new TTC graduates to under-served areas and increased recruitment of TTC intake from these areas; • an across-the-board increase in teachers' salaries; • reinforcement of performance-based incentives, along with the introduction of a performance appraisal system and teacher professional standards; • increased provision of more targeted and focused in-service training; and • introduction of a student and school-based assessment system.

This report aims to contribute to and inform the ongoing debate on policy options. It provides rigorous empirical analysis of the role of both demand- and supply-side factors and policy interventions in facilitating greater access to, completion of, and learning in basic education, especially for the most disadvantaged children. This work is not only timely but also fills a significant knowledge gap as there has been little econometric research conducted in Cambodia on the determinants of basic education outcomes using primary data. Furthermore, the analysis in this report goes beyond the general exploration of these determinants by looking at the lessons from past and ongoing demand- and supply-side interventions in Cambodia.

The ultimate objective of this report is to identify appropriate education interventions that enroll and retain children in basic education, while ensuring their adequate school progress and learning. In addition, this report and its findings highlight the importance of utilizing and improving all existing sources of education data to conduct rigorous impact evaluations of key strategic policy interventions. Finally, this study is part of the Bank's ongoing analytical work on Cambodia's education sector in

The ultimate objective of this report is to identify appropriate education interventions to attract and retain children in basic education, while ensuring their adequate school progress and learning.

support of the Government's ESP/ESSP agenda. To this extent, the report identifies areas where more and deeper knowledge is required and proposes studies aimed at covering these knowledge gaps.

The structure of the report is as follows.

Chapter 1: The first chapter presents a characterization of the profile of the basic education sector in Cambodia using data from the school census as well as household surveys. This chapter identifies the key problems in the basic education system and, thus, introduces the questions that the remaining chapters attempt to address. The main challenge of the basic education system is to keep children, particularly poor children, in school beyond the first few grades of primary school. The remaining chapters address the question: what drives student dropout and what policies can be instituted to stem it?

Chapters 2 and 3: The second and third chapters provide a general characterization of how demand and supply factors are related to student outcomes and then draw policy implications from the results. While the focus of Chapter 2 is on the role of school inputs (quantity and quality), the emphasis of Chapter 3 is placed on demand-side factors, particularly direct and indirect private costs of education. The first part of Chapter 3 is devoted to an analysis, based on data from the 2001 Cambodia Child Labor Survey (CCLS), of the interplay between children's work and schooling. The second part of Chapter 3 completes the analysis of household education costs by examining the scope and nature of private direct costs of schooling, and how they relate to household wealth in determining schooling outcomes. This analysis is derived from data from a recently conducted survey on private costs of education. The final part of the chapter is devoted to the analysis of private benefits to education. As many of the factors highlighted in Chapter 3 may be affected by particular policy interventions, the results presented here have clear policy implications.

Chapter 4: Chapter 4 complements the analysis in chapters 2 and 3 by exploiting the valuable lessons from past and ongoing demand- and supply-side interventions in Cambodia. It also provides international evidence on these types of interventions.

CHAPTER 1: A Profile of the Basic Education Sector

This section provides a profile of the formal basic education sector in Cambodia since 1999 utilizing two data sources: the school census (EMIS) and large-scale nationally-representative household surveys collected by the National Institute of Statistics. The latter include the Cambodia Socio-Economic Survey 1999 (SES 1999), the Demographic and Health Survey (DHS 2000), and the Cambodia Child Labor Survey 2001 (CCLS 2001). A new household survey is now currently underway (Cambodia Socio-Economic Survey 2003-04).

The analysis below describes the levels and trends in access to, progress through, and completion of basic education. It also examines the inequalities in those measures. Because there are no data on student learning available at the national level, the quality dimension of basic education cannot be fully explored. Finally, EMIS serves as the main source of data for education policy and planning. Because it is already well-documented, the results below focus on areas where EMIS data and the household surveys differ and where household surveys offer new or additional information of key policy relevance. The results below highlight the importance of using multiple sources of education data when designing education policy. It is also essential to develop new instruments to provide data in key areas such as student learning.[3]

Results highlight the importance of using multiple sources of data when designing education policy.

The **main findings** of the descriptive analysis are:

- Net enrollment rates are significantly lower in data from household surveys than in EMIS, although both data sources document a significant increase in primary school enrollment in recent times.
- Overage enrollment is pervasive in basic education and is primarily caused by late school entry. Late school entry is not a temporary phenomenon; it is strongly related to ongoing structural factors.
- Most of the recent gain in primary net enrollment rates is due to a net gain in the proportion of children − mostly over-aged − that enter school, rather than children staying longer in school.
- In fact, there has not been any significant improvement in school progress: a significant number of children continue to drop out before completing primary school.
- In absolute terms, the number of primary school graduates has been increasing. This places pressure on the supply of lower secondary education facilities.
- The bottleneck in the basic education system begins in the upper primary grades.
- There are remarkable differences in access to and progress through basic education according to level of wealth.

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[3] A National Assessment System (NAS) is expected to be set up in order to evaluate education quality and student achievement on a continuous basis at the primary and secondary levels through a standardized test in mathematics and Khmer.

- Achieving Universal Basic Education will require addressing the bottleneck in upper primary school and focusing on interventions that promote equitable access and participation.

Net enrollment rates are significantly and consistently lower in household surveys than in EMIS data (Table 1). EMIS data records enrollment rates as close to universal while they are far from universal according to survey data. For the school year 2000-01, for example, EMIS data states that the primary net enrollment rate was 84 percent while CCLS data recorded it as approximately 70 percent. And while both sources of data show a sharp decline in net enrollment rates following primary education, household survey figures are still significantly lower than EMIS figures. Enrollment rates as reported by both sources of data are illustrated in Figure 1.

Compared to EMIS data, household surveys consistently report significantly lower net enrollment rates.

Table 1. Net enrollment rates

Source	Measured As of	Academic Year	Net enrollment rates		
			Primary	L.Sec.	U.Sec.
EMIS	Oct 98	98/99	78.3	14.2	6.4
	Oct 99	99/00	85.5	14.4	9.3
	Oct 00	00/01	83.8	16.6	7.7
	Oct 01	01/02	87.0	18.9	7.4
	Oct 02	02/03	88.9	19.1	6.7
	Oct 03	03/04	90.1	21.3	8.1
CSES	Jan-Aug 99	98/99	57.4	8.9	5.4
DHS	Feb-June 00	99/00	65.0	7.1	6.7
CCLS	April 01	00/01	69.5	8.6	5.3
CIPS	March 04	03/04	79.7	16.8	8.7

Source: EMIS 1998-2004, Cambodia Socio Economic Survey 1999, Demographic and Health Survey 2000, CCLS 2001 and Cambodia Inter-Censal Population Survey 2004. The figures from household surveys in this table and all other tables below are already adjusted for sample weights and survey design to make them representative of the total population.

Figure 1. Primary net enrollment rates – comparison of EMIS and household survey data
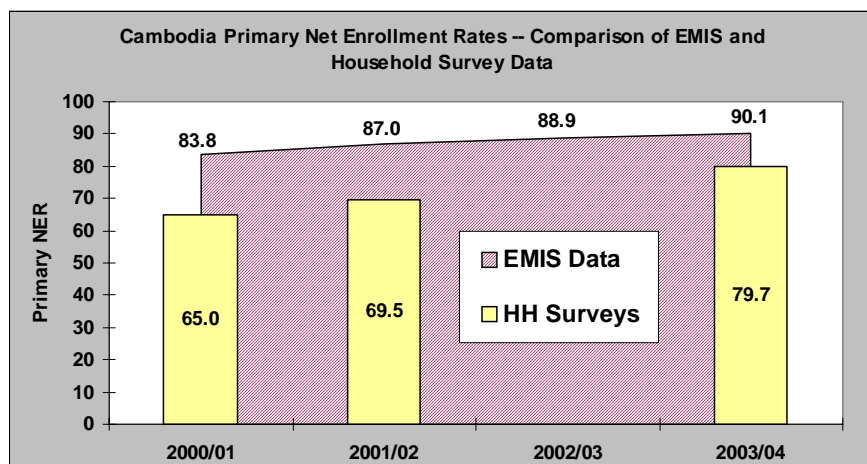
These discrepancies are not due to differences in the corresponding age group population or the absolute numbers of children attending each

school level, but to the age distribution of those attending each school level. More specifically, the discrepancies are due to the fact that students attending each school level are reported to be significantly older in household surveys than in EMIS.[4]

Overage enrollment is caused by either late school entry, slow progress through school, or a combination of the two.[5] EMIS data report significant overage intake and enrollment that increases with the level of schooling (Table 2). CCLS data corroborates this but further emphasizes the impact of both late school entry and over-aged enrollment, stating that approximately 72 percent of children who enter school for the first time are older than 6 and that most children in secondary school are actually over-aged.[6]

Students attending each school level are reported to be significantly older in household surveys than in EMIS.

Table 2. Late school entry and overage enrollment

| | EMIS 2001-02 | | | | | | CCLS 2001 | | | | |
| | % Overage intake in | | | % Overage enrollment in | | | School entry | | % Overage enrollment | | |
	Grade 1	Grade 7	Grade 10	Primary	L. Sec	U. Sec	Avg. age	% Overage	Primary	L. Sec	U. Sec
Total	**57.3**	**78.0**	**70.1**	**30.4**	**42.0**	**35.7**	**7.6**	**72.3**	**40.1**	**78.3**	**58.2**
Urban	48.5	73.6	66.6	27.8	42.3	33.0	7.2	62.2	36.5	73.7	52.9
Rural	58.3	79.6	73.9	31.1	41.8	38.8	7.6	74.4	41.9	80.5	47.1
Remote	69.6	92.0	0.0	27.5	62.4	0.0					
Males	58.1	79.7	72.7	31.9	45.7	39.8	7.6	72.3	41.9	82.1	64.8
Females	56.4	75.6	65.1	28.7	36.2	27.0	7.6	72.2	38.1	71.7	35.2
Poorest							7.7	76.2	41.2	83.5	65.8
Q2							8.2	82.5	39.9	87.1	66.6
Q3							7.6	71.0	42.4	79.1	70.9
Q4							7.3	72.6	41.6	84.8	73.1
Richest							6.8	53.4	35.1	72.3	50.5

Notes: In order to make the results comparable to EMIS, school entry information in the CCLS 2001 refers to children who entered school in the school year of the survey. Wealth quintiles are based on an asset-based household wealth index.

Among children attending school at the time of the CCLS survey, only 30 percent had entered school by age 6; age 7 was the most common school entry age. CCLS also reports that approximately 40 percent of school-aged children entered school at ages 8 and above (Figures 2-4).

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[4] In assessing this difference, it is worth noting that age is measured much more accurately in household surveys than in EMIS, where age of the school's student body is reported by the school director. This age underreporting is also typical of school censuses in other countries (Wils, 2004).

[5] Slow progress through school may be partially attributed to repetition and dropout with subsequent re-entry.

[6] Indeed, the average ages of primary, lower secondary, and upper secondary students are 10.8, 15.8 and 18.1, respectively. Thus, in secondary school the average age of school goers is actually out of the target age group.

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Figure 2. School entry age distribution of school goers aged 6-17 by sex (CCLS)
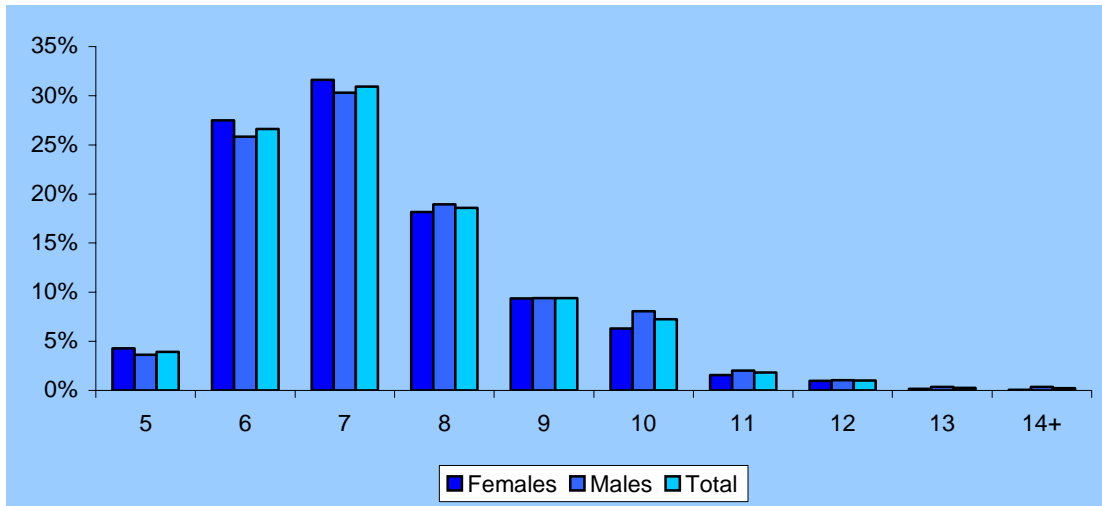
Figure 3. School entry age distribution of school goers by area (CCLS)
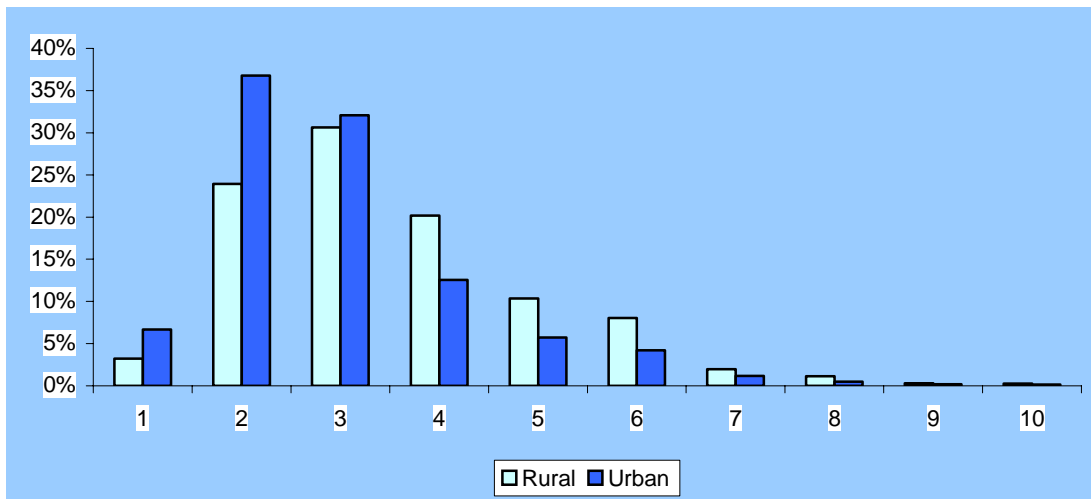
Figure 4. School entry age distribution of school goers by wealth (CCLS)
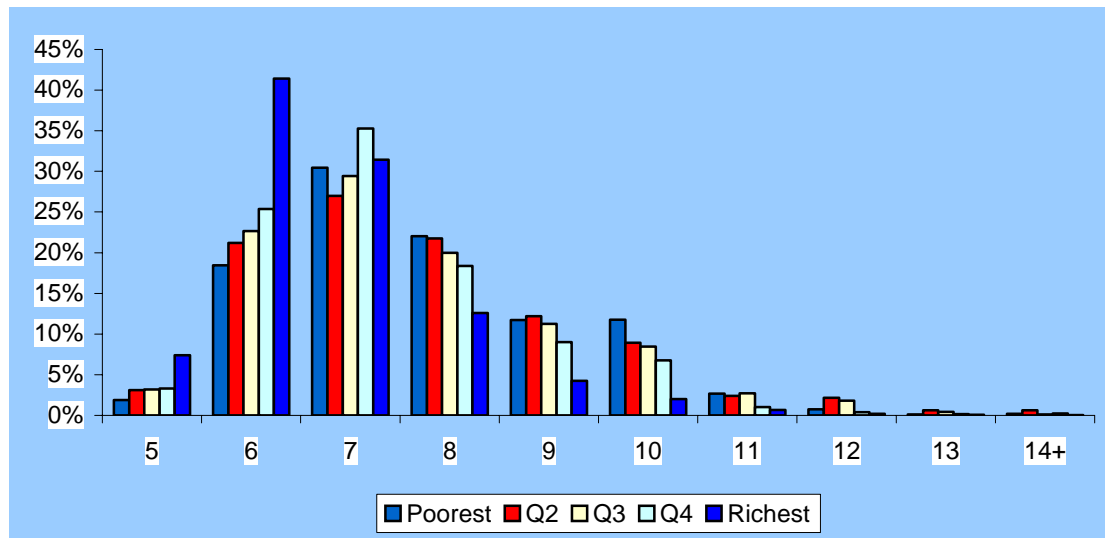
Most of the age-by-grade distortion is due to late school entry. Table 3 indicates that 75 percent of the accumulated school delay[7] of children attending primary school is explained by late school entry. Even among children attending lower secondary school, late entry explains 61 percent of the total delay. The grade-for-age distortion is smaller among those attending lower secondary school, but this merely reflects the cream-skimming process leading up to lower secondary school. That is, children currently enrolled in lower secondary school are more likely to have entered school earlier and have progressed more rapidly through primary school than the general population of children in the same age group that entered primary school.[8]

Most of the age-by-grade distortion is due to late school entry.

Despite the difference in levels, both sources of education data show a clear upward trend in primary net enrollment rates. According to EMIS, however, lower secondary rates have increased over time but have remained largely unchanged according to household survey data over the same time period.

Both EMIS and CCLS data show a clear upward trend in primary net enrollment rates.

Although Cambodian children tend to enter school late, they do, for the most part, eventually enroll: according to CCLS 2001, only 9 percent of children aged 12-14 had never attended school (Figure 5). In fact, most of the gain in recent enrollment rates is due to more children entering school rather than children staying longer in school (Figure 5). The most

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[7] School delay is defined as the difference between the grades the child should have attended if he or she had started at age 6 and had not repeated any grade and the grades the child actually attended.

[8] In fact even those currently enrolled in primary school are not a representative sample of the larger population of children who ever attended school. Thus, the figures in Table 3 are only meant to characterize school delay among children currently enrolled in basic education. Information on school entry age is only available for those currently enrolled in school and there is no information on the age at which individuals have left school.

significant increase in enrollment rates has occurred in the 6-11 age cohort. There has been a modest increase in the enrollment rate of children aged 12-14 and no change in the rate for those aged 15-17. Among children aged 6-11, most of the increase is due to the decrease in the percentage of children in this age group who have never attended school.

Most of the gain in recent enrollment rates is due to more children entering school rather than children staying longer in school.

Table 3. Age-for-grade distortion (CCLS 2001)

	Currently attending primary school			Currently attending secondary school		
	Average delay	% delay explained by		Average delay	% delay explained by	
		Late entry	School progress		Late entry	School progress
Total	**2.54**	**74.7**	**25.3**	**1.71**	**60.7**	**39.3**
Urban	2.11	66.6	33.4	1.46	52.7	47.3
Rural	2.63	76.3	24.7	1.82	64.1	35.9
Males	2.59	73.8	26.2	1.76	61.7	38.3
Females	2.48	75.8	24.2	1.65	59.2	30.8
Poorest	2.90	80.1	19.9	2.23	75.7	24.3
Q2	2.78	79.4	20.6	2.16	65.1	34.9
Q3	2.79	76.2	24.8	1.88	62.7	37.3
Q4	2.46	71.6	28.4	1.92	60.5	39.5
Richest	1.73	64.4	35.6	1.33	55.6	44.4

EMIS data (Table 4) reveals that overage intake increased substantially between 1998-99 and 2001-02. It then decreased thereafter, reaching the level it had been in 1999-2000. That is, there has been a decline in overage enrollment in primary school.[9]

There has been a decline in overage enrollment in primary school.

Two conclusions emerge from this trend:

- the increase in school entry represents a net gain; and,
- Cambodia seems to be experiencing a late entry phenomenon that is common during a period of rapid expansion of a school system, particularly after a period of disruption.[10]

During such periods of rapid expansion,[11] there is a greater amount of delayed entry than might be the case in a stable school system. This is due to the fact that older pupils start school in regions that were previously unserviced by education facilities. In fact, the trends in gross and net intake rates (Table 4) show that the bulk of the new student intake between 1999 and 2004 is attributed to children older than six years of age. This is not to say, however, that late entry is wholly a temporary phenomenon

But school entry age is strongly related to structural factors that are likely to continue inducing late school entry.

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[9] A similar trend cannot be established using household survey data, as CSES 1999 does not have the necessary information to compute overage grade 1 intake.

[10] Similar examples include present-day Afghanistan and Angola, and in the last decade in Mozambique (see Wils, 2004, for a review of the evidence on late entry in developing countries).

[11] According to EMIS data, this period of rapid expansion of the school system likely ended at the close of the 2002-03 school year.

following a period of rapid expansion. The analysis in the next two sections shows that school entry age is strongly related to structural factors that are likely to continue inducing late school entry unless appropriate action is taken.

Figure 5. Decomposition of the change in age-specific enrollment rates (1999-2001)
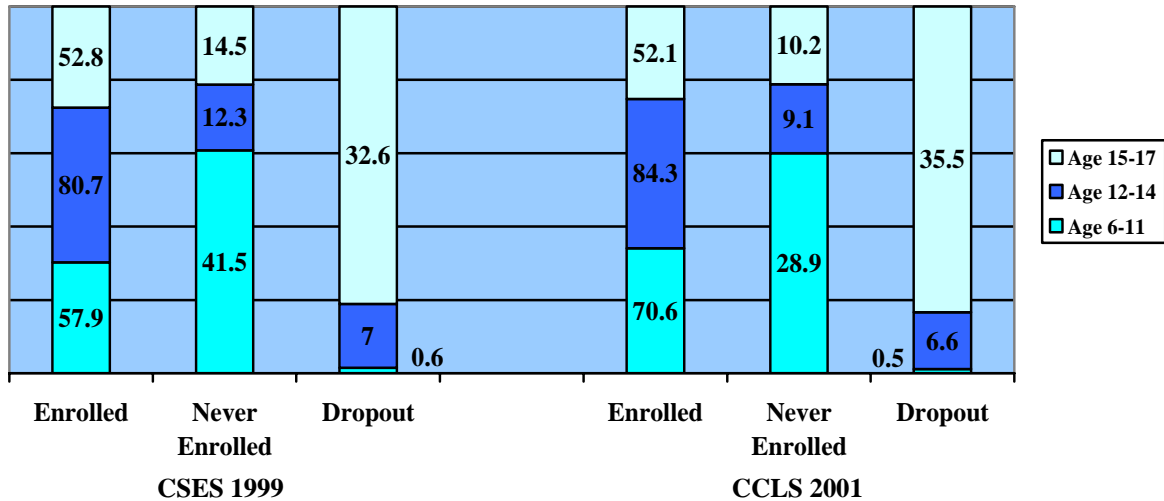
EMIS also presents this picture of gains in enrollment rates within the context of high and stagnant dropout rates (Panel A, Table 5.). Dropout rates, according to EMIS data, have remained stable or even increased during the period considered. Repetition rates, on the other hand, remain high but have declined significantly over time, though they appear to have risen again in the 2003-04 school year.

Figure 6 illustrates primary school grade-specific dropout and repetition rates as reported by EMIS.

Increasing numbers of children are entering the school system and spending some time there. However, from a policy perspective, the critical question is whether this time is sufficient for them to complete the primary education cycle and then enter into lower secondary education to approach the objective of basic education for all. Current high dropout rates, which have shown no sign of decreasing in recent years, suggest that these goals remain elusive. Tables 6-9 report the survival rates, completion rates, and overall completion figures from grade 1 (Appendix A details the underlying assumptions for these constructs).

Dropout rates, according to EMIS data, have remained stable or even increased during the period considered. Repetition rates, on the other hand, remain high but have declined significantly over time, though they appear to have risen again in the 2003-04 school year.

Table 4. Trends in grade 1 intake measures and overage primary enrollment, EMIS

	Intake rate		Overage intake	Overage primary enrollment
	Gross	Net		
1997-98	97.9	59.8	38.9	11.8
1998-99	103.3	62.4	39.5	12.7
1999-00	123.6	71.4	42.2	14.8
2000-01	154.0	76.4	50.4	23.7
2001-02	188.9	80.6	57.3	30.4
2002-03	134.4	78.1	41.9	24.6
2003-04	135.2	78.7	41.8	24.9

Source: EMIS 1997-2004

Table 5. Grade-specific dropout and repetition rates

Grade level	First		Second		Third		Fourth		Fifth		Sixth	
	Rep.	Drop.	Rep.	Drop.	Rep.	Drop.	Rep.	Drop.	Rep.	Drop.	Rep.	Drop.
A. EMIS												
Primary												
98/99	37.8	11.2	24.2	12.4	17.6	12.9	11.4	14.7	6.5	15.4	3.1	15.1
99/00	**28.5**	**10.6**	**17.6**	**10.8**	**15.0**	**11.1**	**9.3**	**11.9**	**5.8**	**13.5**	**2.8**	**14.0**
00/01	17.5	13.5	10.3	11.1	8.1	9.6	5.6	10.4	3.5	11.9	2.3	11.5
01/02	17.7	15.6	10.9	11.5	7.9	9.3	5.4	9.9	3.6	11.1	1.9	12.6
02/03	19.0	13.8	11.6	13.3	9.1	11.0	6.4	10.2	4.2	11.2	2.1	10.7
Lower secondary	Seventh		Eight		Ninth							
98/99	1.9	21.8	1.8	23.0	12.8	29.7						
99/00	**1.7**	**21.1**	**1.4**	**19.9**	**8.9**	**28.4**						
00/01	2.1	15.0	1.8	12.5	9.5	25.0						
01/02	2.5	17.1	2.0	14.0	14.9	25.0						
02/03	2.4	20.9	2.1	17.3	11.2	26.2						
B. DHS (99/00)												
Primary	**23.7**	**0.6**	**5.9**	**1.4**	**3.2**	**2.8**	**3.7**	**3.3**	**2.2**	**4.9**	**2.3**	**7.3**
Lower secondary	**2.3**	**10.3**	**3.3**	**8.9**	**6.1**	**7.9**						

Figure 6. Primary school grade-specific dropout and repetition rates for 1998/99 and 2002/2003
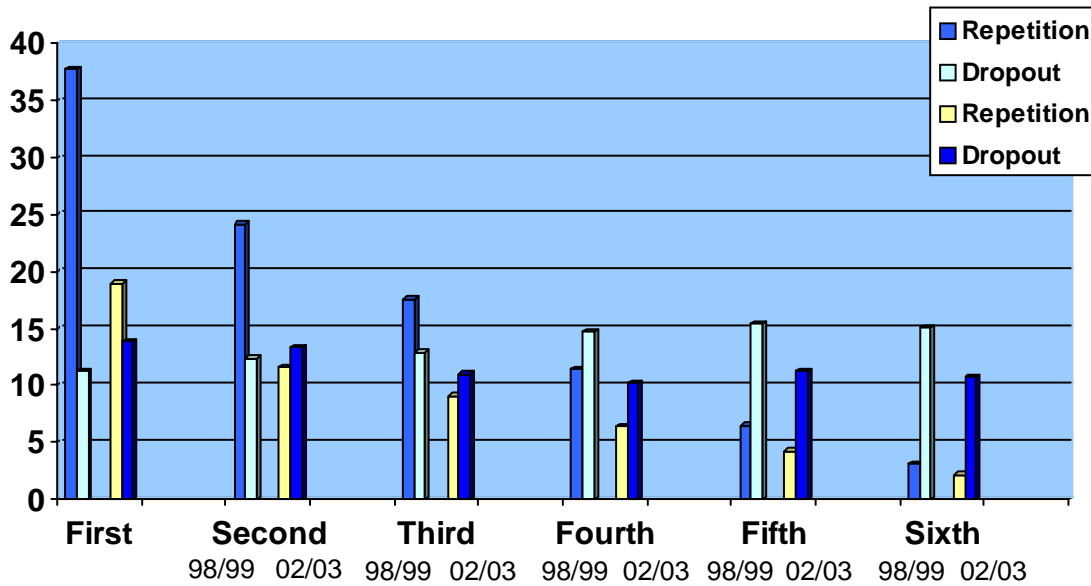
Dropout rates peak in the transition from primary to lower secondary school and remain high throughout this level of schooling. According to EMIS, however, the largest challenge is in the first two grades. To gain further insight into the differences between EMIS and household survey data, Panel B of Table 5. reports flow rates for the school year 1999-00 using actual flow data from DHS 2000 on students who were enrolled in the 1998-99 school year.[12] EMIS figures for dropout and repetition rates are much higher than those from DHS, particularly in lower grades. This gives support to the idea that EMIS estimates are likely to be over-reported.

According to CCLS, completion rates from grade 1 show that the low transition to lower secondary school is due more to a low completion rate of grade 6 than to a low transition after completing primary school. Approximately 75 percent of children who start school graduate from primary school and only 52 percent complete basic education. So, while most children spend some time in primary school, a significant proportion of them drop out before completing it. Figure 7 illustrates completion curves from grade 1 for children in rural and urban areas.

Approximately 75% of children who start school graduate from primary school and only 52% complete basic education.

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[12] DHS 2000 is the only household survey that contains these data.

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Table 6. Survival rates from grade 1

| | EMIS 2001-02 | | | | | | CCLS 2001 | | | | |
	Total	Urban	Rural	Remote	Boys	Girls	**Total**	Urban	Rural	Boys	Girls
Primary											
Grade 2	**78.5**	82.1	78.5	64.5	79.2	77.7	**99.6**	99.7	99.6	99.7	99.5
Grade 3	**66.6**	72.4	66.5	45.4	66.7	66.4	**97.5**	98.2	97.3	98.0	96.9
Grade 4	**58.5**	65.8	58.2	35.4	58.3	58.7	**93.9**	95.4	93.5	94.8	93.0
Grade 5	**51.5**	60.4	50.8	26.6	51.2	51.7	**88.9**	92.2	87.9	90.5	87.1
Grade 6	**45.0**	54.6	44.4	14.2	45.0	45.0	**82.2**	86.7	80.7	85.0	79.3
Lower secondary											
Grade 7	**37.9**	49.3	35.8	7.3	39.3	36.0	**74.7**	81.5	72.2	80.0	69.2
Grade 8	**31.3**	42.1	29.0	6.4	33.1	28.7	**67.5**	76.1	64.2	74.0	60.9
Grade 9	**26.8**	38.9	24.0	5.5	29.2	23.5	**61.2**	72.0	56.6	68.5	53.5
Grade 10+	**18.1**	31.1	13.0	0.0	19.4	16.3	**54.0**	65.1	49.0	62.4	45.3

Notes: EMIS figures are calculated using the reconstructed cohort method. The CCLS figures are Kaplan Meier estimates based on the sample of children aged 6-17. Survival rates indicate the cumulative probability of making the transition to each grade from grade 1. The differences in the CCLS figures by gender and area are statistically significant.

Table 7. Survival rates from grade 1 by wealth quintile

| | Wealth quintile | | | | |
	Poorest	Q2	Q3	Q4	**Richest**
Primary					
Grade 2	**99.3**	99.6	99.5	99.7	**99.8**
Grade 3	**95.9**	97.0	96.7	97.9	**99.3**
Grade 4	**89.2**	91.8	92.5	95.2	**98.0**
Grade 5	**80.4**	84.5	86.1	90.5	**96.3**
Grade 6	**71.4**	74.9	78.8	84.2	**91.7**
Lower secondary					
Grade 7	**58.8**	63.5	70.8	76.0	**87.9**
Grade 8	**50.1**	53.3	62.5	67.2	**82.8**
Grade 9	**39.6**	45.3	56.1	57.9	**78.6**
Grade 10+	**34.7**	35.0	52.3	43.6	**72.2**

Notes: Wealth quintiles are based on an asset-based household wealth index. The differences across wealth quintiles are statistically significant both jointly as well as between pairs of quintiles. The most significant difference is between the richest quintile and the rest
.

Table 8. Completion rates from grade 1 and overall completion rates (CCLS 2001)

	Completion from grade 1 (age 6-17)					Overall completion (age 15-18)				
	Total	Urban	Rural	Boys	Girls	**Total**	Urban	Rural	Boys	Girls
Grade 1	**99.7**	99.8	99.7	99.8	99.7	**89.1**	93.9	87.7	92.3	85.8
Grade 2	**98.3**	98.7	98.2	98.7	98.0	**86.8**	92.0	85.2	90.5	82.8
Grade 3	**94.8**	96.2	94.4	95.4	94.1	**81.2**	88.0	79.2	85.6	76.5
Grade 4	**89.6**	92.7	88.7	91.1	88.1	**73.3**	82.7	70.6	79.0	67.3
Grade 5	**83.6**	88.0	82.1	86.1	81.0	**65.0**	76.0	61.8	72.5	57.4
PRIM completion	**75.3**	82.1	72.9	80.1	70.4	**55.9**	68.1	52.3	65.3	46.5
Grade 7	**67.0**	76.1	63.5	74.4	59.4	**48.0**	61.1	44.1	58.8	37.2
Grade 8	**60.3**	71.6	55.6	67.4	53.0	**41.2**	56.0	36.4	50.6	31.9
LSS completion	**52.5**	65.2	46.7	61.0	43.8	**34.9**	49.8	29.7	44.7	25.3

Notes: Figures are Kaplan Meier estimates. In the sample of children aged 15-18, those who have not entered school by age 15 are no longer considered to be at risk of doing so. The figure for grade 9 refers to grade 9 and above. Figures indicate the cumulative probability of completing the indicated grade. The differences by gender and area are statistically significant.

Table 9. Completion rates from grade 1 and overall completion rates by wealth quintile (CCLS 2001)

	Completion from grade 1 (age 6-17)					Overall completion (age 15-18)				
	Poorest	Q2	Q3	Q4	**Richest**	**Poorest**	Q2	Q3	Q4	**Richest**
Grade 1	**99.6**	99.9	99.7	99.7	**99.8**	**83.2**	79.5	89.5	93.4	**97.3**
Grade 2	**96.8**	98.4	98.1	98.4	**99.5**	**80.0**	76.3	86.5	91.2	**96.6**
Grade 3	**90.7**	93.2	93.4	95.9	**98.4**	**72.8**	68.9	78.9	86.9	**94.5**
Grade 4	**81.7**	84.8	87.4	91.4	**96.7**	**61.7**	57.8	70.0	79.3	**91.7**
Grade 5	**72.1**	75.4	80.7	85.6	**93.6**	**50.5**	48.4	60.4	71.3	**86.6**
PRIM completion	**59.2**	62.7	70.7	78.0	**88.8**	**40.1**	38.1	50.0	61.9	**79.4**
Grade 7	**50.4**	53.7	61.2	66.0	**82.8**	**32.2**	30.9	42.1	51.2	**72.3**
Grade 8	**38.2**	44.7	55.0	57.3	**78.2**	**23.6**	24.9	32.8	41.5	**67.9**
LSS completion	**31.8**	31.5	48.0	43.6	**72.1**	**19.7**	18.0	27.1	31.2	**60.7**

Notes: See notes to Table 6. Wealth quintiles are based on an asset-based household wealth index. The differences across wealth quintiles are statistically significant both jointly as well as between pairs of quintiles, except for the difference between Q2 and Q3 for the 15-18 age group, which is not significant. The most significant difference is between the richest quintile and the rest.

Figure 7. Completion rates from grade 1 by area (CCLS)
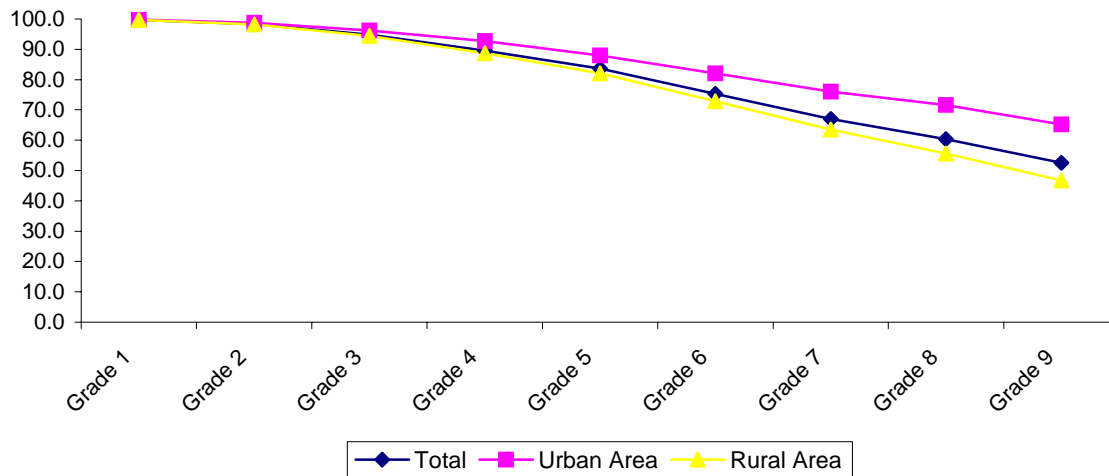
The bottleneck in the basic education system starts in the upper primary education levels. It is worth noting the significant discrepancy between the proportion of children reaching the last grade of primary education and the first grade of lower secondary education, and the proportion of children actually completing these grades.

Despite significant gains in primary enrollment rates, school progress in basic education has remained unchanged over time. This further substantiates the results of Figure 5. The completion rates from grade 1 of both primary and lower secondary levels were 75 percent and 67 percent, respectively, in 1999 (SES 1999). However, while primary school completion rates have not changed, the system is graduating significantly more students as the number of students actually entering school continues to increase. This creates substantial pressure on the supply-side of lower secondary education as the country struggles with an inadequate supply of schools and teachers. The lack of any significant improvement in school progress at the primary level is reflected in the fact that lower secondary school net enrollment rates have seen only insignificant change.

Despite gains in primary enrollment rates, school progress in basic education has remained unchanged over time.

After accounting for the 11 percent who never attended school, the percentage of children between 15 and 18 years of age that enter school and complete primary school is only 56 percent. This is far from the Government's goal of universal primary education. Additionally, only 35 percent of those who start school actually complete the basic education cycle. These figures represent only a modest improvement over 1999 (54 percent and 34 percent respectively), and almost all of this improvement is due to a decrease in the proportion of children who never attended school (roughly 15 percent in 1999).

Only 56% of children actually complete primary school.

Both EMIS and CCLS reveal significant differences in net enrollment rates by geographical area (Table 10). However, while EMIS shows significant gender differences in all three levels of schooling, these differences are not

statistically significant according to CCLS. CCLS does, however, indicate statistically significant gender differences in the enrollment rates of children aged 12-14 and even greater differences among children aged 15-17. The discrepancies between net and age-specific enrollment rates arise because most of the target population for lower secondary (i.e. 12-14) are actually attending primary school (90 percent), and most of the target population for upper secondary school are actually in primary (53 percent) and lower secondary (37 percent). As was shown earlier, this is due to slow progress through school and, specifically, late school entry. In the case of gender, Table 2 shows that boys and girls tend to enter at roughly the same age. But the table also shows that, as girls are disproportionately filtered out throughout primary education (Table 6), the selected group of girls that do manage to reach lower secondary education are, on average, younger than boys reaching that level.

Table 10. Enrollment rates

| | EMIS 2001-02 | | | | CCLS 2001 | | | | | |
| | Primary | | L. Sec | | Primary | | | L. Sec | | |
	Gross	Net	Gross	Net	Gross	Net	6-11	Gross	Net	12-14
Total	**125.1**	**87.0**	**32.7**	**18.9**	**118.0**	**69.5**	**70.6**	**33.3**	**8.6**	**84.3**
Urban	121.7	87.8	54.9	31.7	122.5	76.3	77.6	52.7	17.7	89.0
Rural	127.0	87.5	28.5	16.6	117.0	68.0	69.1	28.7	6.4	83.2
Remote	97.3	70.6	3.8	1.4						
Males	131.9	89.8	39.5	21.4	121.6	69.5	70.6	39.9	8.8	85.9
Females	118.1	84.2	25.6	16.4	114.3	69.5	70.7	26.3	8.4	82.7
Poorest					104.7	61.1	61.7	15.1	2.8	76.8
Q2					100.5	59.4	60.5	15.7	2.3	75.6
Q3					120.1	67.9	69.3	26.6	6.3	85.0
Q4					135.1	77.6	78.5	37.0	6.4	89.5
Richest					**134.6**	**85.0**	**86.6**	**70.3**	**24.6**	**93.9**

Notes: The third column in each school level under CCLS 2001 refers to the appropriate age-specific enrollment rate. Wealth quintiles are based on an asset-based household wealth index.

Differences in enrollment rates based on household wealth are much more pronounced than those mentioned above.[13] In terms of enrollment rates, there are three clearly defined groups: the lowest two wealth quintiles; the two quintiles in the middle; and clearly distinct from the others, the richest quintile.

Differences in enrollment rates based on household wealth are significant.

Average survival and completion rates hide very significant differences based on geographical area, gender, and, above all, wealth. In terms of school progress (Table 6), both sources of data show significant differences in survival rates across geographical areas. In relation to

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[13] Wealth quintiles are based on a household wealth index constructed on the basis of information on housing conditions and asset ownership.

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gender, the data sources differ in ways that have important policy implications. Specifically, except for the transition to lower secondary school, EMIS reports no significant differences in survival rates between boys and girls, while significant differences exist according to CCLS. CCLS figures indicate that, although boys and girls are equally likely to be enrolled in primary school, there is a 10-percentage-point difference in the probability of completing primary school. Gender differences emerge in grade 3, become much more marked in grade 5, and peak in the transitions to grade 6 and to lower secondary school.

Figure 8. Completion rates from grade 1 by sex (CCLS)
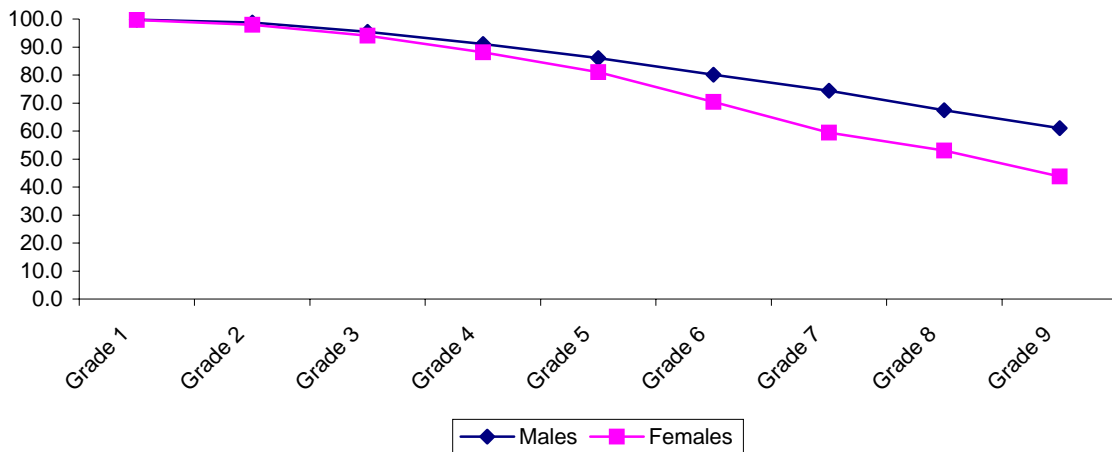
However, it is in terms of wealth that the differences are most noticeable. As with enrollment rates, differences in survival and completion rates are clearly delineated along the same wealth groupings that appeared above. Differences between the poorest and the wealthiest quintiles, in terms of completion rates from grade 1, begin in grade 2 and continue to widen throughout basic education. This is particularly true in the last grade of primary school, which is completed by almost all children in the richest quintile (89 percent) but only 59 percent of the children in the poorest quintiles. In terms of education attainment as measured by overall completion rates of children aged 15-17, the differences are even greater: children in the richest quintile are 17 percent more likely to enter school than children in the poorest quintile.

The poor tend to enter school significantly later than children of other economic groups.

Figures 9-10 illustrate survival and completion rates by wealth quintile. In addition, Table 2 demonstrates that the poor tend to enter school significantly later, which increases both dropout and repetition rates within this group.

Because of the significant steady decline in student survival throughout primary education, particularly along wealth lines, the almost universal transition from primary school completion to lower secondary school will be difficult to maintain in the future. Assuming that school progress

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improves among the poorest children, the pool of primary school graduates will become more heterogeneous than it is at present. The differences in primary school completion by wealth quintiles also indicate that unless access to and progress through primary school is improved, particularly upper primary, any investment in secondary school would not likely function as "pro-poor." The results discussed in the following sections indicate that interventions at the secondary school level, such as increasing the availability of lower secondary schools, may have a beneficial impact on access to and progress through primary school. It is less clear, however, whether or not these interventions will actually benefit the poorest of the population.

Figure 9. Survival rates from grade 1 by wealth
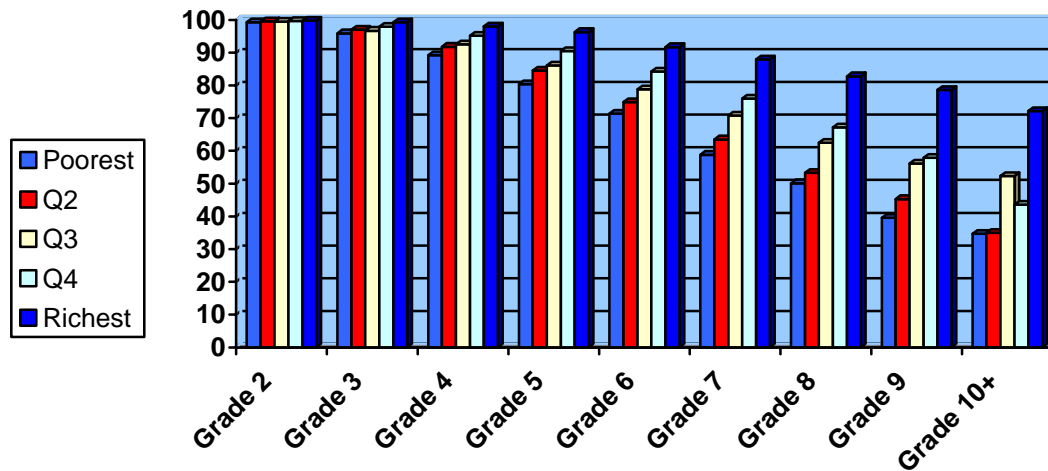
Figure 10. Completion rates from grade 1 by wealth (CCLS)
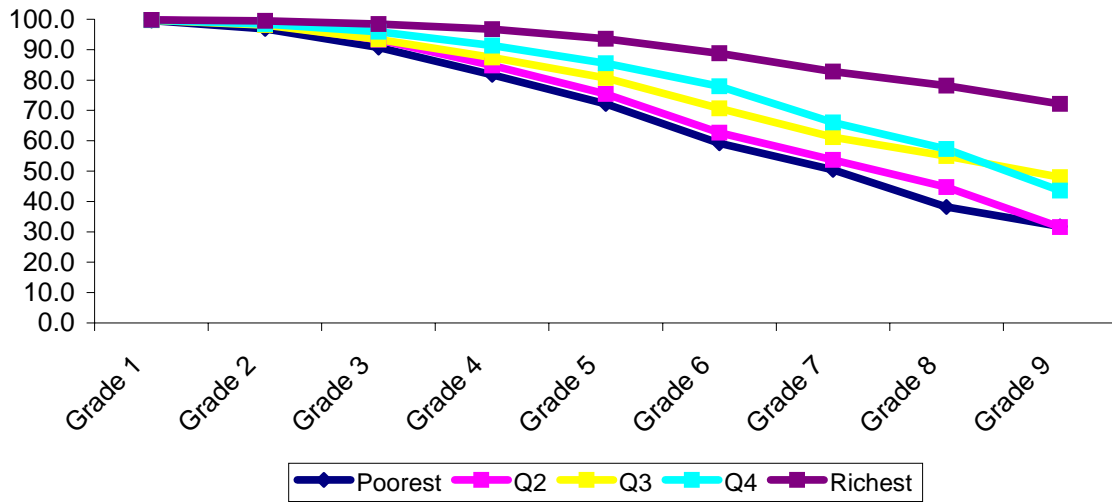
Thus, despite the remarkable improvement in primary enrollment rates, current trends in enrollment, school progress, and educational attainment figures suggest that Cambodia remains far from its goal of universal primary education. The bottleneck in the basic education system begins in the upper primary grades rather than lower secondary. Furthermore, the results show that efforts to increase access to, retention in, and completion of primary and lower secondary education need to be specifically targeted at children in the poorest two quintiles.

Unless something is done to improve the access to and progress through primary school, any investment in secondary school would not be "pro-poor."

CHAPTER 2: Student Outcomes and School Inputs

2.1. Background

Having found that the main problem of the basic education system is to keep children in school beyond the first few grades of primary school, the question is then: what drives student dropout and what policies can be instituted to stem it? This chapter addresses this issue while focusing on the quantity and quality of school inputs and their impact on dropout rates. In particular, the chapter utilizes EMIS data for the school year 2002-03 to investigate the relationship between education outcomes and inputs within a multivariate framework. EMIS data is further combined with commune-level data on poverty and inequality, as well as World Food Program (WFP) data on child health and nutrition, to gain insight into the role of health and socio-economic factors in determining education outcomes. For a detailed description of the multivariate framework analysis, refer to Appendix B.

The key results of this chapter are the following:

- Policies that attract children to school at the age of 6 are key to reducing primary school dropout.
- To promote early entry and to reduce dropout rates, efforts are needed to attend to the school readiness of children early on through the provision of, for example, pre-school education.
- In order to improve access to and progress through school, the cost-effective completion of all primary schools is critical.
- The expectation of schooling opportunities beyond primary education in the form of LSS availability increases early access to school and reduces primary school dropout.
- The availability of health-related facilities (i.e. drinking water, latrines) and learning facilities (i.e. libraries) are also important for keeping children in school.
- The quality of teachers as measured by education level is a key factor in keeping children in primary school. Teachers' educational backgrounds and pre-service training are diverse and unevenly distributed across Cambodia. The quality of pre-service training is low and the opportunities for professional development are limited.
- The availability of complementary inputs that enhance the performance of teachers, such as teacher guides, increases early access to and progress through primary school.
- Girls' dropout behavior responds to school inputs the same way as boys,' but more intensively.
- While supply-side factors like school and teacher characteristics have a notable impact on primary school outcomes, they explain very little of the variation in student outcomes across LSSs.

2.2. Primary Schools

Late school entry

Late school entry is significantly associated with higher dropout rates. A 10-percentage-point increase in the proportion of over-aged children that enters school increases the dropout rate by 0.5 percentage points on average, per grade. This translates into a 3-point increase over the complete primary school cycle. Late school entry may have both a direct and an indirect influence on a child's chances of dropping out of school later in their career. As a direct result of late entry, older children are enrolled in classes with younger students. They may find it difficult to adjust to the lower maturity level of these younger students and are therefore less likely to continue schooling in the event that he or she fails a grade. Indirectly, late school entry may influence dropout rates by increasing the opportunity costs of schooling in relation to child work. Given the pervasiveness of late school entry in Cambodia, and its significant effect on subsequent dropout, it is critical to design policies that facilitate access to school at an early age. For instance, it may be appropriate to promote compulsory school entry at age 6 through community awareness campaigns.[14] Also, in addition to polices that encourage children to enter school earlier, the positive link between late entry and higher dropout rates indicates the need for policies specifically intended to encourage older pupils to stay in school.

Late school entry is significantly associated with higher dropout rates.

Poverty, stunting, and inequality

Schools located in communes with higher levels of inequality have significantly higher dropout rates. The observable differences in dropout rates by level of poverty and stunting, as well as the differences between remote, rural, and urban areas, disappear once one controls for school characteristics. Both poverty and stunting become insignificant when controls are added for overage intake and teacher characteristics. This indicates that:

Schools located in communes with higher levels of inequality have significantly higher dropout rates.

- overage intake and the quality of teachers are very much distributed along socio-economic lines; and
- because of their strong association, it is very difficult to isolate the effects of poverty and stunting from those of overage intake and teacher characteristics.

In fact, as discussed below, poverty, stunting, and inequality act as determinants of dropout rates by influencing the age at which children enter school, which in turn affects dropout rates. Controlling for the significant differences in overage intake by geographical area, a 10-percentage-point increase in the proportion of households below the

Poverty and stunting play a key role in determining dropout rates.

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[14] Canals-Cerda and Ridao-Cano (2004) show for Bangladesh that making school entry compulsory at age 6 would increase the chances of transitioning into secondary school by 8 percent, where most of the effect comes from the reduction in the probability of working while attending school.

poverty line is associated with 1.3 point increase in dropout rates per grade (7.8 over the full primary cycle). Similarly, a 10-point increase in the prevalence of stunting among children aged 0 to 5 is associated with a 1.7-point increase in dropout rates (10.2 over the full primary cycle).

Because economic forces may increase late entry and dropout, the overall results on poverty and inequality suggest that policies offering incentives to households that enroll children in school early and keep them in school, may prove largely beneficial. Likewise, the results on stunting are consistent with international evidence showing that improved health and nutritional status among preschool children is associated with earlier enrollment in school, lower likelihood of grade repetition, and improved progress through school (e.g. Alderman et al., 2001).

Availability of preschool facilities

Schools with preschool facilities attached to them have consistently lower dropout and repetition rates. Controlling for the school's socio-economic environment, the availability of pre-school facilities reduces the dropout rate by 0.7 percentage points per grade (4.2 points over the full primary cycle). A similar effect is found with repetition rates. There is also significant international evidence showing that increasing the access and quality of preschool education has a positive effect on student progress and learning. Increases in access and readiness improve, among other things, the intellectual readiness of children for primary school. These results, coupled with those on stunting, highlight the potential benefits of an integrated early childhood development (ECD) program that combines preschool education with child health and nutrition.

Schools with preschool facilities attached to them have consistently lower dropout and repetition rates.

Availability of secondary schools

The physical availability of a nearby lower secondary school reduces the average entry age and is therefore associated with a significant decline in dropout rates. Controlling for the socio-economic status of the commune, the nearby presence of a lower secondary school reduces overage grade intake by 3.2 points and reduces the dropout rate by 1.1 points per grade (6.6 points over the full primary cycle). Thus, the proposed expansion of lower secondary education in Cambodia may have unintended additional benefits in relation to school progress. Directly, the ready access of nearby schools may lower school entry age and thereby, indirectly, reduce associated dropout rates.[15] Additional analysis by poverty quintile, however, suggests that those primary schools located in the poorest quintile do not benefit from the nearby presence of a lower secondary school.

Children who live physically near a lower secondary school are more likely to stay in primary school.

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[15] There is a growing body of international evidence on the importance of the availability of additional levels of schooling to improve primary school outcomes (e.g. Canals-Cerda and Ridao-Cano, 2004; Lavy, 1996).

Table 11. Age-specific models for student flows, primary schools

	Dropout		Repetition		Promotion	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Intercept	27.49	13.9	28.64	17.4	45.98	19.9
Grade 2	-3.33	-14.0	-6.64	-37.4	10.02	41.0
Grade 3	-4.86	-20.3	-9.21	-47.8	14.27	53.9
Grade 4	-4.08	-16.1	-11.51	-58.5	15.80	57.4
Grade 5	-2.63	-9.8	-13.23	-63.4	16.08	54.4
Grade 6	0.82	2.1	-14.54	-63.1	14.10	34.9
Rural area	-1.39	-1.8	-3.29	-4.9	4.58	5.1
Urban area	-0.55	-0.6	-3.03	-4.3	3.56	3.7
Poverty	0.00	0.6	-0.01	-1.0	-0.00	-0.1
Inequality	0.05	2.4	-0.07	-4.7	0.02	0.8
Stunting	0.03	1.5	-0.05	-2.6	0.01	0.6
LSS in the commune	-1.07	-4.8	-0.21	-1.1	1.28	4.8
Pre-school attached	-0.70	-2.7	-0.68	-3.2	1.36	4.3
Overage grade 1 intake	0.05	8.6	-0.03	7.0	-0.02	2.5
Highest grade offered	-0.34	-2.2	-0.75	-5.8	0.85	4.8
Parental association (PA)	-0.22	-0.6	0.21	0.7	0.11	0.3
Number of meetings of PA last year	0.02	0.5	-0.08	-2.7	0.06	1.3
Community donations	-0.82	-2.3	-0.16	-0.6	0.93	2.2
Director: female	-1.13	-2.9	-0.05	-1.5	1.61	3.6
Director: Years of service	-0.01	-0.6	0.03	1.8	-0.01	-0.4
Director: LSS completed	-0.60	-1.2	0.15	0.4	0.60	1.1
Director: USS or higher completed	-0.70	-1.1	-0.56	-1.1	1.45	2.0
Classrooms: physical conditions	0.06	0.7	-0.04	-0.5	-0.04	-0.4
Classrooms: furniture conditions	0.05	0.6	-0.05	-0.6	-0.04	-0.4
School facilities: drinking water	-0.50	-2.1	0.92	4.6	-0.43	-1.5
School facilities: latrines	-1.09	-3.9	-0.58	-2.5	1.69	5.1
School facilities: library	-0.67	-2.4	-1.42	-5.6	2.15	5.9
School facilities: librarian	-1.27	-4.5	-0.62	-2.4	1.83	5.1
Teachers: % female	-0.02	-4.0	-0.00	-0.9	0.02	3.9
Teachers: % with 5-15 years of exp.	-0.03	-4.3	-0.01	-1.2	0.03	4.4
Teachers: % with >15 years of exp.	-0.04	-6.3	-0.00	-0.8	0.04	5.8
Teachers: % with pedagogic training	0.00	0.4	-0.01	-1.3	0.00	0.3
Teachers: % with LSS completed	-0.01	-2.3	-0.01	-1.0	0.02	2.5
Teachers: % with USS+ completed	-0.03	-3.4	-0.02	-3.0	0.05	4.7
Teachers: % in salary scale a, b or c	-0.01	-2.1	-0.00	-0.0	0.01	1.6
Teacher guides: availability	-0.76	-2.4	0.58	2.4	0.17	0.5
Teaching shifts: single Vs multiple	-0.18	0.6	0.87	3.1	-0.70	-1.9
Pupil-class ratio	-0.03	-3.1	0.03	3.7	0.00	0.2
Sample size	25,698		26,799		25,698	
R^2	7.52		25.10		22.38	

Notes. Highlighted coefficients are statistically significant at the 5 percent level or less. Dropout, repetition and promotion rates, as well as variables indicating percentages are measured in a 0 to 100 scale to facilitate the reading and interpretation of the results. Coefficient estimates measure the percentage-point change in the student flows associated with having the characteristic X relative to the reference category (in the case of indicator variables (e.g. latrines), and a 1 percentage point increase in characteristics X relative to the reference category for variables measured in percentage points (e.g. teacher experience), and to a 1 unit increase in characteristics that are measured in unit (e.g. highest grade offered).

Table 12. Models for age-for-grade distortion measures, primary schools

	Overage grade 1 intake		Overage enrollment	
	Coeff.	t-ratio	Coeff.	t-ratio
Intercept	44.23	8.6	0.23	0.1
Rural area	-10.68	-6.0	-4.40	-4.3
Urban area	-9.93	-5.1	-6.30	-5.5
Poverty	0.13	6.4	0.04	3.6
Inequality	0.44	7.8	0.03	0.9
Stunting	0.17	2.9	0.00	0.1
LSS in the commune	-3.24	-4.4	0.29	0.8
Pre-school attached	-1.63	-1.7	-0.84	-1.6
Highest grade offered	-2.11	-6.8	4.66	32.7
Parental association (PA)	-0.17	-0.2	0.45	0.8
Number of meetings of PA last year	-0.11	-0.8	-0.14	-2.2
Community donations	0.27	0.2	1.38	1.9
Director: female	0.66	0.5	2.39	3.0
Director: Years of service	-0.12	-2.1	-0.05	-1.7
Director: LSS completed	-4.79	-3.7	-1.11	-1.6
Director: USS or higher completed	-6.43	-3.8	-1.42	-1.6
Classrooms: physical conditions	0.07	0.3	-0.27	-2.0
Classrooms: furniture conditions	-0.47	-2.0	-0.00	-0.0
School facilities: drinking water	-4.16	-5.3	-0.15	-0.3
School facilities: latrines	1.37	1.6	0.37	0.8
School facilities: library	-1.57	-1.5	-0.01	-0.0
School facilities: librarian	-3.31	-3.2	1.97	3.2
Teachers: % female	-0.02	-1.2	-0.01	-1.3
Teachers: % with 5-15 years of exp.	-0.04	-2.6	-0.01	-1.1
Teachers: % with >15 years of exp.	-0.09	-5.7	-0.03	-3.7
Teachers: % with pedagogic training	-0.01	-0.4	0.02	1.3
Teachers: % with LSS completed	-0.03	-1.6	-0.02	-2.3
Teachers: % with USS+ completed	-0.02	-1.1	-0.02	-2.0
Teachers: % in salary scale a, b or c	-0.03	-1.7	0.00	0.6
Teacher guides: availability	-3.95	-3.3	-1.38	-2.7
Teaching shifts: single Vs multiple	-4.95	-5.0	-1.38	-2.7
Pupil-class ratio	0.32	7.1	0.07	3.7
Sample size	5,694		5,706	
R^2	14.53		21.95	

Incomplete schools

Incomplete schools, by not offering the full range of primary school grades, have a negative impact on education outcomes. In addition to the obvious loss associated with the grades not offered, they also have been shown to increase school entry age, dropout rates, and repetition rates in those grades offered.[16] Controlling for the socio-

Incomplete schools contribute to late entry and higher dropout and repetition rates in those grades offered.

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[16] Note that in contrast with the other education outcomes, the variable "highest grade offered" in the overall enrollment model is only meant to

economic environment of the school and other school characteristics, for each grade that is not offered in the primary cycle, a 2.1 point increase in overage intake is observed. Incomplete schools are also associated with a 0.3-point increase in the dropout rate and a 0.8-point increase in the repetition rate per grade offered. For an average incomplete school of 3 grades, this translates into an overall increase in dropout and repetition rates of 2 and 6.8 points respectively.

The impact at the individual school, as demonstrated above, is magnified at the aggregate level by the high percentage of incomplete primary schools throughout the country. While most villages in Cambodia have a primary school, 40.5 percent of them are incomplete – 25.1 percent in urban areas, 39.1 percent in rural areas, and 78.7 percent in remote areas. This is a clear example of the impact that supply-side variables have on the household demand for schooling. Households are likely to react to the expectation of an incomplete primary cycle by enrolling children later (if at all) and then withdrawing them earlier. Any effort to improve access to and progress through school must begin by ensuring all primary schools in Cambodia offer the complete primary cycle in a cost-effective manner.

40.5% of village primary schools are incomplete.

School facilities

Schools offering health-related facilities and learning-related facilities have consistently lower dropout rates.[17] The availability of drinking water is significantly associated with lower overage intake. Furthermore, schools with latrine and library facilities tend to have lower repetition rates. These findings are consistent with international evidence on the benefits of maintaining a healthy school environment that promotes learning. These general results are corroborated by Marshall (2004) in the context of specific school investments under the Cambodia Education Quality Improvement Project for three provinces.

Schools with health- and learning-related facilities have consistently lower dropout rates.

Management, incentives, and participation

The quality of school management, teacher monetary incentives, and the degree of community participation in school appear to play a significant role in attracting children to school early and keeping them in school. When similar teacher characteristics are added, the proxies for school directors' skills (experience and education) lose their significance in explaining dropout rates. As in the case of poverty and stunting, this indicates that it is very difficult to separate out the effect of these two highly correlated sets of variables. School

The quality of school management, teacher monetary incentives and the degree of community participation in school play a role in attracting children to school early and keeping them in school.

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control for exposure to the risk of being over-aged, and thus it does not have any structural interpretation.

[17] The existence of a librarian (which is not necessarily tied to the availability of a library) is actually included in the model as an indicator of the 'wealth' of the school.

directors' skills affect dropout rates indirectly by reducing the age-for-grade distortion at school entry.

There is very little variation in teacher salaries across primary schools in Cambodia. But, controlling for the main determinant of this variation (teacher experience), the variation that remains suggests that teachers do respond to higher salaries and that this is reflected in lower dropout rates. Controlling for the socio-economic environment, schools where the community contributes to their financing have lower dropout rates.[18] These findings are also corroborated by qualitative research on decentralized school management and planning with community participation (Geeves et al., 2002). This suggests that institutional reforms dealing with the way education services are provided may have significant payoffs if they emphasize school autonomy and empower local stakeholders in decision-making.

Teachers

Teacher quality is strongly associated with lower dropout rates. The higher the average experience and education levels of teachers, the lower the dropout rates. Schools with more experienced teachers also tend to attract children earlier into school. However, the education level of teachers loses its significance in explaining overage intake when the education level of the school director is included in the model. This re-emphasizes the strong correlation between the two and the difficulty in separating them. As mentioned earlier, teachers tend to be very unevenly distributed across Cambodia, with more qualified[19] teachers being placed in wealthier areas. This highlights the need to provide appropriate incentives for more qualified teachers to be deployed in more disadvantaged areas. The lack of significance of teachers' pedagogic training is likely attributed to the lack of variation in this variable rather than by the lack of importance of pre-service training.[20] Unfortunately, there is no information in EMIS on actual years of pre-service teacher training acquired by teachers.

The higher the average experience and education levels of teachers, the lower the dropout rates

A diversity of educational background and pre-service training continues to characterize the teacher labour force in Cambodia (Duthilleul, 2004). This is a reflection of the different formulas under which primary and lower secondary teachers have been trained over the years.[21] In addition, there are limited opportunities for

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[18] This community financing is used as a proxy for community involvement in school operations.

[19] More qualified in terms of experience and education level.

[20] In particular, 85 percent of the schools report 100 percent of teachers to have had pedagogic training.

[21] Primary teachers: 3 years of primary education + 1 year of teacher training; 4+1, 4+3, 5+3, 8+1, 8+2, up to the current formula of 12+2. Lower secondary teachers: moving from 7+3, 8+3, 11+2, to 12+2.

professional development: in-service teacher training efforts have been sporadic, unstructured, and concentrated at the primary level.

Beyond the quantity dimension of teacher education and training, Duthilleul finds the quality of pre-service training to be low. Based on information from interviews with stakeholders, current teacher education programs have limited relevance to classroom practice and teacher trainers are inadequately prepared.

Further research on teacher quality and incentives in relation to student outcomes will be necessary to refine existing ESP policies to attract, retain, motivate, and develop qualified teachers in primary and secondary schools. This is an important knowledge gap − particularly since it comes at a time when there is growing concern in MoEYS about the quality of teachers as well as their numbers, given the expected rapid expansion of the lower secondary sector. The reform of the teaching remuneration and incentive structure must be embedded within broader civil service sector reform efforts addressing, among other things, the poor working conditions of civil servants.

High quality teaching depends not only on the individual capabilities of teachers, but also on the supply and quality of other complementary school inputs, as well as teachers' incentive structures. Incentive structures include both teachers' compensation and the rules governing the hiring, deployment, promotion, training, and termination of teachers. These factors influence the supply of teachers, which will be crucial for the expansion of lower secondary education. The full characterization of teachers and teacher incentive structures is beyond the scope of this report.[22] It is, however, commonly held that the working conditions of teachers in Cambodia are poor. Teacher pay is low and often unreliable, and teachers generally must supplement their incomes with work outside the school. As noted earlier, teacher pay appears to have a significant effect on student dropout. On the in-service teacher training side, recent evidence from Marshall (2004) on EQIP indicates that money invested in teacher development had the highest payoff in terms of student learning, as measured by numeracy and literacy test scores.

As to the availability of complementary inputs that increase the performance of teachers, the results are revealing. Specifically, they show that the supply of school teacher guides in the core 4 subjects decreases dropout rates directly by about 4 points per grade (24 points overall), as well as indirectly by reducing overage intake.

The supply of teachers is another factor for consideration. Results show neither crowded classrooms nor one teaching shift have a pronounced direct negative impact on dropout rates. However, schools with crowded classes and multiple shifting consistently

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[22] See Duthilleul (2004) for a descriptive analysis of some of these issues.

attract older children to school and thus may have an indirect effect on the dropout rate. A higher percentage of female teachers are also significantly associated with lower dropout rates.

Gender

Girls' dropout behavior tends to respond to education inputs in the same direction as boys, but is more sensitive to them than boys.[23] But while statistically significant, gender differences are relatively small since the gender gap in dropout rates, as reported in EMIS, is very small to begin with.[24] Girls are significantly more sensitive to the presence of preschool facilities, health and sanitation facilities, and the percentage of female teachers. Dropout rates of girls and boys follow the same pattern throughout the primary grades but the difference across grades in dropout rates is more marked for girls. In terms of school entry age, a greater proportion of girls in poor communes tend to drop out than boys living in the same communes.

Girls' dropout behavior tends to be more sensitive to education inputs than boys'.

Geographical area

An analysis of the differences by area reveals that, relative to both schools in urban and rural areas, schools in remote areas have 'worse' school characteristics in terms of dropout. They are, however, more sensitive to the same characteristics that cause a school to have lower dropout rates.[25]

2.3. Lower Secondary Schools

Contrary to the results for primary schools, very few school characteristics and environmental variables have a significant role in explaining dropout rates in LSSs. A comparison of Appendices C and D clearly shows that:

- in general, lower secondary schools have 'better' characteristics and environments than primary schools; and
- LSSs are more homogenous in terms of these characteristics than primary schools.

However, Table 13 illustrates that a good deal of variation remains in characteristics across LSSs. As discussed earlier, there is a significant filtering out of students throughout primary school and into LSSs, and thus the selected groups of students who start LSSs:

- are more homogenous than those who start primary school in terms of individual and household characteristics (e.g. household wealth); and

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[23] In this model, education outcomes are gender-specific but the education inputs are all gender-neutral except the overage intake in the school.
[24] EMIS data show a 1.1 point difference in dropout rates between genders.
[25] The difference between urban/rural areas vs. remote areas is 17.9 points.

- have 'better' characteristics as regards education outcomes.[26]

Nonetheless, Table 13 indicates that there is some variation across schools, as well as within schools across grades, in education outcomes.

Thus, the lack of explanatory power of the models for education outcomes is not explained by the lack of variation in school characteristics or education outcomes at the school level (or within schools across grades). It is due to the lack of *joint* variation. The task at hand is to determine what accounts for this observed phenomenon. The role of household wealth, direct costs of education, and opportunity costs from child work will be explored in the next section.

Examining more closely the results in Tables 11-13, two preliminary points are noteworthy. First, some of the variables used for primary schools were dropped due to insufficient variation. Second, overage LSS enrollment and grade 7 intake reflect, to a large extent, progress through primary school and, in particular, primary school entry age. Thus, other things being equal, it is not surprising to find that grade-for-age measures are poorly related with LSS characteristics.

Urban areas have lower dropout and repetition rates than rural and remote areas. Running the models for schools in differing geographical settings reveals that rural and remote schools have less desirable school characteristics than their urban counterparts. School characteristics are also found to have less of an impact in determining education outcomes in rural and remote areas.[27]

Urban areas have lower dropout and repetition rates than rural and remote areas.

Commune-level poverty rates are more likely to act as a determinant of education outcomes at the primary level than at the secondary level within a particular commune. Poverty becomes statistically insignificant when the proportion of female teachers is considered. As in the case of primary schools, LSSs with a higher percentage of female teachers and more qualified teachers[28] tend to be located in communes with lower poverty levels.

LSSs that offer the full secondary cycle have consistently lower dropout rates. Thus, controlling for the socio-economic status of the commune, the availability of upper secondary grades within the same school increases the likelihood of staying in school while attending LSS grades.

LSSs that offer the full secondary cycle have consistently lower dropout rates.

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[26] EMIS does not contain data on outcomes of individual students but on school-level averages or grade-level averages for each school in the case of student flows.

[27] The total difference in dropout rates is 8.39 percentage points.

[28] The degree to which teachers are qualified is determined by years of experience and level of education.

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Table 13. Age-specific models for student flows, LSS schools

	Dropout		Repetition		Promotion	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Intercept	27.74	6.6	-1.07	-0.5	72.66	16.0
Grade 7	-1.11	-2.1	0.13	0.7	0.99	1.9
Grade 8	11.48	14.1	13.16	25.6	-24.40	-26.0
Urban area	-4.28	-4.1	-1.34	-2.2	5.64	5.0
Poverty	0.03	1.46	-0.01	-0.8	-0.02	-0.9
Upper secondary grades offered	-3.13	-2.7	0.19	0.2	2.99	2.7
Overage grade 7 intake	0.01	0.4	-0.00	-0.2	-0.01	-0.4
Parental association (PA)	1.22	1.0	-1.71	-2.2	0.53	0.4
Number of meetings of PA last year	-0.20	-1.4	0.01	0.2	0.19	0.4
Director: female	-1.55	-1.0	0.10	0.1	1.42	0.9
Director: Years of service	0.06	1.0	0.02	0.8	-0.08	-1.4
Director: USS completed	-1.20	-1.5	0.42	0.9	0.84	1.0
Director: college completed	-0.71	-0.6	0.32	0.5	0.54	0.4
Classrooms: physical conditions	0.27	0.9	0.04	0.3	-0.35	-1.1
Classrooms: furniture conditions	0.13	0.4	-0.17	-1.1	0.07	0.3
School facilities: drinking water	0.57	0.7	0.20	0.4	-0.73	-0.9
School facilities: latrines	-0.24	-0.2	-0.50	-0.8	0.78	0.7
School facilities: library	-2.34	-2.8	0.46	1.0	1.84	2.2
School facilities: librarian	-0.71	-0.6	0.35	0.5	0.25	0.2
Teachers: % female	-0.07	-2.7	0.00	0.1	0.06	2.4
Teachers: % with 5-15 years of exp.	0.01	0.6	-0.01	-0.5	-0.00	-0.2
Teachers: % with >15 years of exp.	-0.05	-1.5	-0.01	-0.7	0.07	2.0
Teachers: % with USS completed	-0.03	-1.4	0.02	1.7	0.01	0.5
Teachers: % with college completed	0.03	0.9	-0.01	-0.2	-0.03	-0.8
Teachers: % in salary a or b Vs c or d	-0.03	-2.5	-0.01	-0.8	0.04	2.7
Teacher guides: availability	0.22	0.2	0.19	0.4	-0.38	-0.4
Teaching shifts: single Vs multiple	1.41	1.7	-0.21	-0.4	-1.25	-1.5
Pupil-class ratio	-0.09	-1.8	0.10	2.9	0.00	0.0
Sample size	1,539		1,548		1,539	
R^2	27.33		43.97		30.61	

Notes. Highlighted coefficients are statistically significant at the 5 percent level or less. Dropout, repetition, and promotion rates, as well as variables indicating percentages are measured in a 0 to 100 scale to facilitate the reading and interpretation of the results. Coefficient estimates measure the percentage-point change in the student flows associated with having the characteristic X relative to the reference category (in the case of indicator variables (e.g. latrines), and a 1 percentage point increase in characteristics X relative to the reference category for variables measured in percentage points (e.g. teacher experience), and to a 1 unit increase in characteristics that are measured in unit (e.g. highest grade offered).

LSSs with a greater percentage of female teachers have lower dropout rates. The coefficients on teacher experience and education experience the expected change but are not statistically significant. As is the case with primary schools, LSSs in which teachers are on higher salary scales have lower dropout rates when one controls for the main determinant of salary scale (teacher experience). This result may suggest that teacher performance is indeed affected by higher salaries and that this is reflected in lower dropout rates.

LSSs with a greater percentage of female teachers have lower dropout rates.

Girls have consistently higher dropout rates in LSSs than boys, with a 5.84-percentage-point difference. As is the case in primary education, boys and girls both respond to education inputs similarly, but they have a greater impact on girls than on boys.

Girls have a consistently higher drop out rate in LSSs.

The presence of a library in the school in also associated with lower dropout rates.

CHAPTER 3: Analysis of Household Demand for Schooling

The analysis thus far has focused primarily on school characteristics and, for the most part, has ignored the role of private costs of schooling. The total cost of schooling comprises direct costs[29] plus indirect or opportunity costs based on the value of the child work that will be forfeited for time spent in school. The analysis of the previous section also does not provide any information about children who have never attended school. Finally, the preceding analysis is based on school averages, which hide important heterogeneity among children attending these schools. Averages, for example, mask the individual characteristics unique to each student's personal make-up as well as characteristics pertaining to his or her parents and household. The analysis of this heterogeneity, however, can provide further insight into the role of demand-side factors on schooling.

The first part of this chapter examines the interplay between children's work and schooling using the data from the 2001 CCLS. The second part examines the scope and nature of private direct costs of schooling. It also explores the relationship between these direct costs and household wealth in determining schooling outcomes, using data from a recently conducted survey on private costs of education. The chapter ends with an analysis of the private benefits of education.

3.1. Child Work and Schooling

Overview

In Cambodia, as in many other poor countries, low levels of educational attainment are accompanied by a high incidence of child labor. At both the national and supranational levels, there has been increased concern for working children in recent years. This can be witnessed in a number of initiatives, most notably in the context of the International Program on the Elimination of Child Labor (IPEC). Since 1992, the Government of Cambodia has been involved in several national and international activities aimed at combating the worst forms of child labor. The perception of child labor as a "problem" stems from its presumed harmful effects on the health and intellectual development of children, which can create deficiencies that may condemn these children to perpetual poverty. However, while some work activities of children are unquestionably detrimental to their physical and/or mental well-being, most tasks undertaken by Cambodian children do not fall clearly into these categories. The majority of Cambodian children work within family-owned enterprises or in domestic activities. Some academics argue (Boyden et al., 1998) that in a poor country like Cambodia with a large rural population and few employment

The majority of Cambodian children work within family-owned enterprises or in domestic activities.

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[29] Direct costs include, for example, formal and informal school fees, uniforms, stationery and textbooks, and transportation costs.

opportunities in modern sectors, these forms of child work may even add to children's practical skills and prepare them for a livelihood appropriate to their context.

Even these softer forms of child labor, however, may be detrimental to the extent that they interfere with schooling. Work may delay or prevent school entry. While attending school, working children may find themselves less able to excel as a result of exhaustion or insufficient time dedicated to schoolwork. This may increase their tendency towards failure, repetition, or dropping out altogether.

Structure of Analysis

In any case, it is critical to identify the type of work that may potentially interfere with a child's schooling. Conventional definitions of "work" that neglect domestic work underestimate the amount of labor done by girls and thus also underestimate the impact of this labor on school attendance or participation. This report, therefore, adopts a broader definition of work that includes productive work and economic activities as well as domestic chores.[30] They are treated separately in the analysis below.

Additional considerations in the identification of work among children include the timing and time-intensity of child work. Because the primary concern of this report is with work that may potentially interfere with schooling, sporadic and/or small amounts of part-time work or employment undertaken during school vacations are, for the most part, ignored in this analysis. As a basis for defining a child's work status, all work undertaken during the week prior to the survey interview is considered. A minimum cutoff of 14 hours per week is then applied in order to identify a working child.[31] This information is further refined for those who have attended school at some point during the 12 months prior to the interview.

From a policy perspective, it is important to note not only how much child work interferes with schooling, but how policy makers might effectively address this reality. There is wide speculation that banning child labor entirely is unlikely to eradicate the phenomenon and may even be counterproductive. More generally, the design of policies aimed at improving child schooling by reducing child labor must be based on

It is important to note not only how much child work interferes with schooling, but how one might effectively address this reality.

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[30] The definition of productive work follows international standards and includes economic activities for pay: unpaid family work or for family profit; independent work for own gain/profit/final use; and work done to pay a debt or final consumption. The definition of domestic work follows the standard in this type of survey, but it is open to more subjectivity than that for productive work. It includes housekeeping activities or household chores in own parents'/guardians' or spouse's home on a regular basis.

[31] This is done separately for productive and domestic work. The 14-hour threshold is used by the International Labor Organization to define light work. This hour cutoff is also standard in this type of analysis but it is somewhat arbitrary. However, the basic results do not change when applying different hour cutoffs.

rigorous analysis of the underlying causes of child labor and the identification of children whose schooling is most negatively affected by work.

The analysis of the impact of work on the schooling experience of children presents two major complications in the context of the CCLS data. The first complication deals with the timing of work in relation to school events. Most of the information on child work relates to the status of the situation at the time of the survey.[32] Because no schooling history is available, it is not possible to determine the relationship between current work involvement and past school history of a student. The data limits us to drawing inferences based only on current work and school records. Similarly, information on school entry age is only available for children attending school at the time of the survey. There are no available records in relation to age or retention rates for those students who had dropped out of school prior to the survey. Thus, one cannot gauge the effect of work on school entry age for school dropouts, nor examine whether or not work was a catalyst for their withdrawal from school. This is because one cannot identify whether a school dropout who is currently working began working before or after dropping out. It is critical to determine the impact of work on withdrawal in order to design suitable policies. If work causes school dropout, then policies to eradicate child labor are justified. However, if failure in school results in a child being put to work, then policy measures must address the reasons for school failure as a first priority.

A second complication is that household decisions regarding schooling and work of children are interrelated and thus dependent on many common factors that are not accounted for by CCLS data. As a result, the differential between working and non-working children in terms of school dropout, for example, may be due to the influence of these common factors and not to the actual effect of work on school dropout − which is the primary interest.[33]

The model

As a result of these two issues, a more indirect and static approach to examining the relationship between school and work is adopted. For a detailed explanation of the model, refer to Appendix E.

Before discussing the results of the multivariate analysis of child work and schooling, some descriptive statistics on children's work activities are presented. The 2001 CCLS is a nationally-representative household survey specifically conducted to examine child labor issues. The survey covered 12,000 households in 600 villages.[34] However, as a nationally-

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[32] There is also information on the age at which the child started working.

[33] Econometrically, dealing with the endogeneity of work to schooling outcomes requires the difficult task of finding information on some factor that affects child work but not schooling conditional on work.

[34] The CCLS also included a small establishment survey. The survey follows a stratified sample design and, thus, sampling weights are needed for the analysis of

representative household survey, it is unlikely to capture those children who do not belong to a typical "household" as defined by the survey. Homeless children, orphans, and those involved in street vending and child prostitution are examples of groups that may go unrepresented in such a generalized survey. The survey was part of IPEC, an International Labor Organization (ILO) program to which the RGC subscribed in 1997.

The provisions dealing with child labor in the current labor code are largely in line with the ILO Convention No. 138 that was ratified by the RGC in 1999. These provisions set the minimum age of employment at 15 years, but allow children aged 12-15 to engage in light work provided that:

- the work is not hazardous to their health and psychological development; and
- the work will not affect their school attendance.

In addition to the implementation of legal provisions on the minimum age of employment and the ratification of international conventions, the RGC has also been working to address the problems of street children and children in prostitution with the help of UNICEF and several other NGOs.

3.1.1. *Descriptive statistics on school and work activities by children*

The analyses in the following two sections are based on the sample of children aged 6-17 (and their households) from the 2001 CCLS.[35] The information regarding work performed during the previous 7 days is reported by both the children themselves and their guardians. While there are some theoretical reasons to prefer the information reported by the children (to the extent that parents may tend to underreport their child's work), in practice it makes very little difference. Based on this, and on the fact that the parental data is far more complete than the children's data, the work information reported by the parents is used for the below analysis. The final sample includes data from 26,029 participants, of whom 13,298 were boys and 12,731 were girls.[36] Tables 14-15 further enumerate some key statistics on school and work activities of children by gender and age group.

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these data. See NIS (2002) for details on the survey, in general, and the sample design, in particular.

[35] The lower age limit is set at 6 to be consistent with the official school entry age. The upper age limit is set at 17 since the focus of the analysis is on the relationship between work and the basic education experience of children, and 17 defines the end of childhood. Although children aged 15-17 are the target population for upper secondary school, 90 percent of those attending school at the time of the survey were enrolled in the basic education cycle.

[36] The samples sizes are 12,650 (6,486 boys and 6,164 girls); 6,762 (3,459 boys and 3,303 girls); and 6,617 (3,353 boys and 3,264 girls) for the 6-11, 12-14, and 15-17 age groups, respectively.

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Table 14. School participation of children by gender and age group

	Both sexes				Boys				Girls			
	6-11	12-14	15-17	6-17	6-11	12-14	15-17	6-17	6-11	12-14	15-17	6-17
School **% Enrolled**	**70.3**	**84.3**	**52.1**	**69.6**	**70.3**	**85.9**	**61.8**	**72.1**	**70.3**	**82.7**	**41.7**	**66.7**
Average school entry age among enrollees				7.4				7.5				7.3
Of those not enrolled % Never enrolled (versus dropout)	98.5	58.0	21.5	65.8	99.0	63.1	19.6	69.5	98.9	53.6	22.9	62.5

Notes: See text for details

School participation

As noted earlier, school participation rates peak among children aged 12-14 and then decrease significantly thereafter. Gender differences do not appear until ages 12-14 and increase significantly thereafter. Almost all children aged 6-11 who are not in school, have never attended school. This proportion decreases significantly as age increases, indicating that most of these children do eventually enter school, but enter late. As noted earlier, late entry explains most of the observed overage enrollment: 90 percent of children aged 12-14 currently enrolled in school are still attending primary school, while 90 percent of those aged 15-17 and currently enrolled in school are still in basic education (53 percent of them are actually in primary school).

Productive work

According to the least restrictive definition of productive work,[37] most children (56 percent) are engaged in this form of work. Although child work is pervasive everywhere, it is especially so in rural areas. A significant portion of time is devoted to productive work – on average, 25 hours per week. This explains why, even after using the 14-hour cutoff to define work, 46 percent of children still reportedly work. Not surprisingly, the extent and intensity of productive work increases sharply with age. Even among children aged 6-11, who are prohibited from working, 38 percent are performing some form of productive work (28 percent if the 14-hour cutoff is applied).

On average, children devote 25 hours per week to productive work.

Children become involved in productive work at an early age (10 years). As will be demonstrated, this delays and even prevents school entry. There are no statistically significant gender differences in the extent or time-

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[37] The least restrictive definition of productive work is work in economic activities for at least an hour during the last week.

intensity of productive work across any age group, except girls aged 15-17 years who work significantly more hours than their male counterparts. Boys and girls also begin working at the same age.

Figure 12 illustrates the breakdown of type of employment for boys and girls aged 6-17 who are engaged in productive work.

Figure 11. Type of employment for those currently engaged in productive work, boys 6-17

casual unpaid
3%
paid employment
3%
self-employed/
employer
2.75%
casual paid
4%
unpaid family
worker
87%
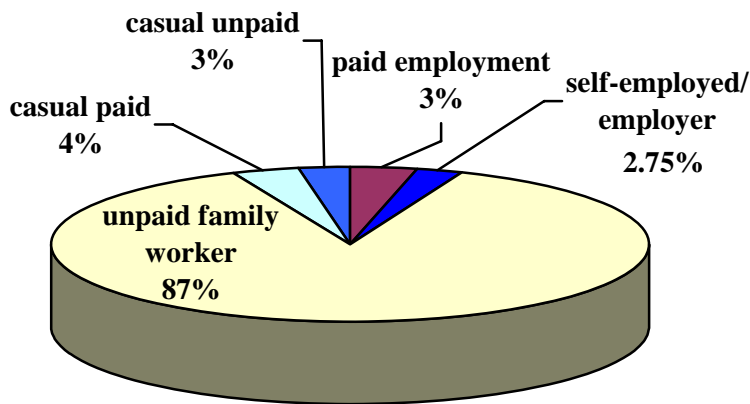
Figure 12. Type of employment for those currently engaged in productive work, girls 6-17

casual unpaid
3%
paid employment
5%
self-employed/
employer
3%
casual paid
3%
unpaid family
worker
86%
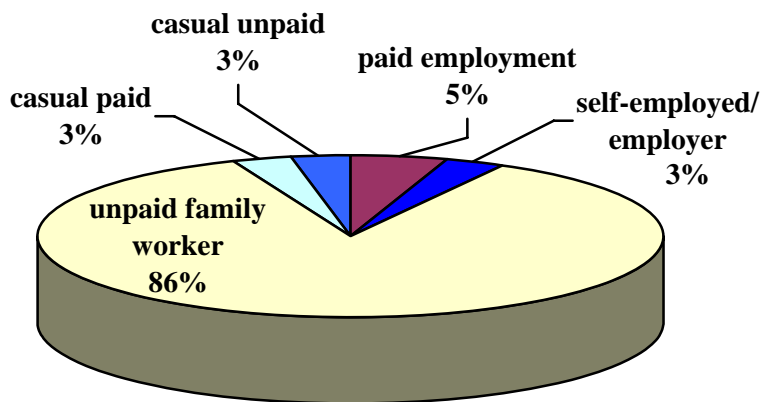
The type and nature of child employment reflect Cambodia's larger labor market (Ridao-Cano, 2004). Most children work as unpaid family workers

(87 percent), although this percentage declines somewhat with age in favor of paid employment. This is especially true amongst girls.[38] Most children are involved in agricultural work (62 percent), followed by street retail trade (15 percent), and forestry or wood collection (6 percent). Girls are less likely to work in agriculture than boys but more likely to work in street retail trades, garment production, and domestic service. Thus, the bulk of child labor is related to subsistence agriculture, which is a reflection of the greater Cambodian economy.

Were the child wage perfectly competitive, it would be an appropriate measure of the opportunity cost of school time even if a child were working exclusively on the household farm. However, the limited size of the paid child labor market in Cambodia, particularly at younger ages, makes this wage an unrepresentative measure of the shadow child wage. It may still however be used as an illustrative figure. Daily earnings of children (in-cash and in-kind) are far from inconsequential for Cambodian families. On average, children earn approximately $1 per day, accounting for 28 percent of the total household labor income. Not surprisingly, child earnings and their share in total household labor income increase sharply with the age of the child, regardless of gender. However, even among primary school-aged children the share is as high as 15 percent. These results may indicate that the opportunity cost of schooling in terms of child productive work is high and increases rapidly with age. The child daily wage is not representative of the opportunity costs of schooling in terms of work (i.e. including domestic work) or marriage opportunity (e.g. cultural pressures to marry after a certain age is reached). On both accounts, the child daily wage is likely to underestimate the opportunity costs for girls. If the child wage is used as an imperfect measure of the opportunity costs of schooling, and is compared with the direct cost estimates in the next section, it clearly amounts to the most significant component of the total cost of schooling.

Domestic work

A significantly larger proportion of children are reportedly engaged in domestic work (79 percent), although this work is far less intensive than productive work. As a result, the proportion engaged in domestic tasks declines to 20 percent when applying the 14-hour cutoff. There is no significant difference in either the extent or intensity of domestic work between rural and urban areas. As with productive work, both the extent and intensity of domestic work increases with age. Even at its peak, however, domestic work accounts for only approximately one-third of the average hours spent on productive work.

Domestic work, however, starts at an earlier age than productive work (between 8-9 years of age). With boys and girls beginning work at roughly the same age, girls are significantly more likely to be engaged in domestic work, and to work longer hours than boys. Hence, any analysis of child

86% of children who work are classified as unpaid family workers.

On average, children earn approximately $1 per day, accounting for 28% of the total household labor income.

79% of children are engaged in domestic work.

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[38] The percentages in each type of employment may not add up to 100 due to a marginal residual category ("other").

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work that fails to include domestic work seriously underestimates the labor performed by girls and thus its potential negative impact on girls' schooling. As illustrated by Figure 13 below, the most commonly performed domestic activity is cleaning the house/washing clothes (30 percent), followed by meal preparation (27 percent), and retrieving water (26 percent). By gender, girls tend to be significantly more engaged in meal preparation but less in retrieving water, than boys.

Figure 13. Domestic activity performed, both boys and girls
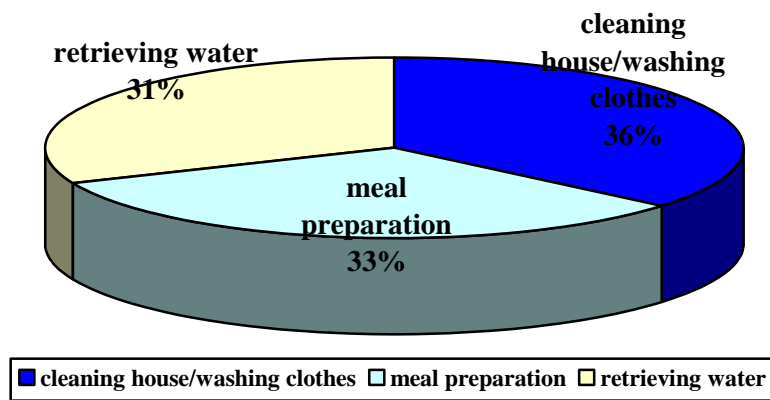
Cross-classification of school and work activities

Since the primary concern of this report is to examine how schooling and work interact, Figure 14 presents the cross-classification of current school and work participation using the 14-hour per week cutoff. Although the largest group of children is that of children enrolled in school who do not work (34 percent), this group is smaller than the combined groups of children who both attend school and engage in some form of work (36 percent).

Most working students either perform household chores or, more commonly, productive duties but a significant proportion are actually engaged in both types of activity. There is significant variation in child activities by age. The proportion of non-working students and idle children (not in school and not working) decline significantly with age, while the proportion of working children who are out of school increases rapidly with age. The proportion of working students peaks at ages 12-14 and then declines.

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Figure 14. School and work activities of children by gender
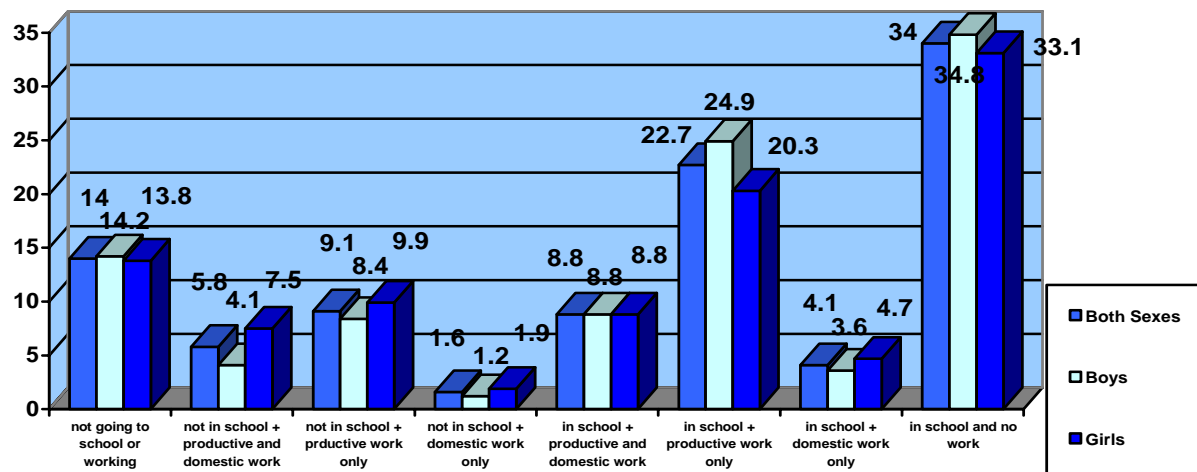
There are three particular points of these results that are especially worth noting:

- Children in Cambodia tend to enter school late, so the chances of being in school increase significantly between the ages of 6 and 14. The likelihood of involvement in work tends to increase strongly with age. The latter tends to create a spurious positive correlation between school and participation through age.

- The very high proportion of working students in the 12-14 age group suggests that the short duration of the primary cycle school day allows many children to successfully combine school attendance with work responsibilities.

- The subsequent decrease in the proportion of working students and the corresponding increase in working children who are out of school suggests that this ability to combine school and work diminishes at later ages. This is due to the fact that both work and school become more demanding with age and grade level, particularly when moving from primary school to secondary school.

The ability to combine school and work diminishes at later ages.

There are also significant differences in work activities by gender. While both sexes share the same overall structure of activities, girls tend to work in greater proportions, mainly due to their higher domestic work burden. Working girls also seem to have greater difficulty combining work responsibilities with schooling. This is partly related to the fact that work seems to be more demanding for girls than for boys. Girls are also more likely to be engaged in both productive and domestic work than boys. This difference is first noted between the ages 12-14 but becomes increasingly apparent at ages 15-17. A full 87 percent of girls aged 15-17 were working at the time of the survey, versus 81 percent of the boys. Of these girls, 63 percent were not attending school, versus 42 percent of boys, and 41

Working girls have greater difficulty combining work responsibilities with schooling

percent of them were engaged in both domestic and productive work, versus 31 percent of the boys.

In addition to the cross-classification of current school and work participation, Table 15 illustrates the interaction between work and school entry. The proportion of children who started working before school entry is far from negligible, particularly in domestic work, and thus work may help to explain both late school entry and school dropout itself. For a detailed explanation of this interaction, refer to Appendix F.

Table 15. Work activities before school entry of children by gender

	Both sexes aged 6-17		Boys aged 6-17		Girls aged 6-17	
Work before school entry						
% productive work before entering school		10.3		9.9		10.7
% domestic work before entering school		18.0		17.4		18.6

Notes: See text for details.

Appendices G and H report the means of the variables used in the model by main school-work category, age group, and gender.[39]

3.1.2. *Multivariate analysis of current school and work activities*

The theoretical framework

A simple economic model of household behavior is used to guide the empirical specification below. Assume that parents, in order to maximize household welfare, choose the amount of time their children participate in alternative activities. A child's education may therefore be shaped by parental choices.

Even if parents are in favor of educating their children, their decisions are likely to be influenced by the given labor market returns to education. When making choices, parents also consider the relationship between education outcomes (e.g. years of education completed) and schooling time, as well as the supply and quality of school inputs. They also take the technological relationships governing the production of different household goods (e.g. farm goods, non-farm business goods, and goods related to domestic activities, such as child care) a given.

Parents must finally adjust their choices to what the household can afford at a given point in time, particularly if access to credit is limited. Affordability is defined by household income including child market

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[39] To ease readability, the data is summarized by main school-work categories - idle, work only, school and work, and school only- and not by the full set of school-work categories. For the same reason, the means of indicator variables (i.e. 1 versus 0 variables) and variables expressing percentages are all expressed in a 0 - 100 scale.

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wages minus the prices of different goods consumed by the household, including schooling.

One of the outcomes of this welfare maximization process is a system of demand equations for the children's time allocated to schooling, productive work, and domestic work. These equations demonstrate how children's time in each activity is related to the set of preferences and technological factors, prices, and household incomes outlined above.

The basic rule that governs how these factors affect schooling time is illustrated by the shadow price of schooling, which has two basic components:

- the opportunity cost of school time in terms of the value of the 'product' from work foregone, and
- the direct costs of schooling.

For detailed information on the model's application, see Appendix I.

The relationship between school and work activities

The trade-offs between school and work activities are indirectly investigated by looking at the correlations between characteristics, both observable and unobservable, across the estimated equations for school and work participation (see Appendix J).[40]

School, productive work, and domestic work activities are jointly related for both boys and girls and across age groups. The hypothesis of independence between the school and work equations is rejected in all cases.

School and work activities are generally negatively related, that is, the observable and unobservable characteristics that increase the likelihood of child work also tend to decrease the probability of attending school and vice versa. In contrast, productive and domestic work is positively related. Thus, school and work appear as largely substitute or incompatible activities, particularly school and productive work. Productive and domestic work, on the other hand, appears to be more complementary. Part of the reason for this is that productive and domestic duties tend to be performed in or around the house while schooling time is mainly spent in school, away from home.

School and work are largely substitute or incompatible activities, particularly school and productive work.

The relationship between school and productive work becomes more negative with age, particularly among girls. Thus the trade-off or degree of substitution between school participation and productive work increases as

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[40] Correlations among unobservable characteristics are estimated as part of the model as the correlation parameters of a trivariate normal distribution. Correlations among observable characteristics are based on the correlation among equation indices, that is, the linear combination of model covariates.

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the child gets older, particularly among girls. A variety of factors may explain this finding, including:

- the opportunity cost of schooling in terms of market work increases with the age of the child;
- the time-intensity of work and school activities increases with age; and
- other things being equal, in higher age groups the child is more likely to be engaged in paid work outside the family business, which is likely to be less flexible than working for the family.

The change in the nature and time-intensity of productive work may also help to explain why, especially in relation to girls, this type of work becomes less compatible with domestic work as the child gets older. As shown earlier, girls in the 15-17 age group work longer hours and are more likely to be involved in paid employment than boys. In fact, among children aged 15-17, girls' productive work is significantly more likely to interfere with their schooling than boys' productive work.

Girls between the ages of 15-17 are more likely than boys of the same age to be involved in productive work that interferes with their schooling.

Interestingly enough, the relationship between school and productive work among 6-11 year-olds is positive, although not significantly so. As shown earlier, almost all children aged 6-11 who are not currently attending school have never been in school, but a significant proportion of them will eventually enter school. Thus, within this age group, the primary focus is on school entry. The only school outcome for which timing can be precisely pinpointed is school entry. This allows a more precise analysis of the relationship between school and work. As is shown below, the probability of entering school increases with age regardless of work while the probability of beginning to work increases over the same age segment. This tends to create a spurious positive correlation between school and work participation through age. This spurious correlation, in fact, blurs a true negative effect of work on school entry. This negative effect explains the overall positive correlation between school and productive work for children aged 6-11.

The relationship between school and productive work becomes less negative with age in the case of boys. In fact, it is only significantly negative among boys aged 6-11. In the case of girls, it peaks between the ages of 12-14 and then becomes insignificant. By the ages 15-17, the negative relationship between school and productive work completely overshadows that between school and domestic work. School and domestic work appear to be largely independent activities. This difference in the age pattern of the relationship between school and the types of work may be explained by:

School and domestic work appear to be largely independent activities.

- the increase in domestic work-intensity over time is not as dramatic for domestic work as it is for productive work;
- the level of domestic work-intensity is significantly lower than that of productive work;

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- over time, productive work tends to be increasingly performed outside the family business, thus becoming less flexible than domestic work performed at home;

- since domestic work does not change much in intensity or nature over time, children are likely to learn how to best manage these tasks, making them more compatible with other activities; and

- opportunity costs of schooling in terms of domestic work are not likely to change much over time and they decrease relative to opportunity costs in terms of productive work.

The 6-11 age group is the only one for which this relationship (in terms of unobservable characteristics) is consistently more negative than that between school and productive work for both sexes. This may be related to the fact that the starting age for domestic tasks is significantly lower than that for productive work and is therefore more likely to potentially interfere with school entry. Among girls aged 12-14 years, the trade-off between school and productive work seems to be as significant as that between school and domestic work. Thus, in the age range of 12-17 years, girls' work is significantly more likely to interfere with schooling than boys' work.

In the 12-17 age range, girls' work is significantly more likely to interfere with schooling than boys'.

The relationship between work and the two levels of school non-participation − dropping out and never having attended school − were also separately examined. There are no significant differences in the relationship between work and other sources of school non-participation. The only exception to this is with domestic work among children aged 12-14, which is more negatively related to school entry than to school dropout.

Model results: covariates

Appendix J reports the marginal effects associated with each covariate for each equation (school, productive work, and domestic work) by age group (6-11, 12-14, and 15-17) and sex (boys and girls).[41]

Child characteristics

Within the 6-11 age group, school participation initially increases with age as children who delayed school entry finally enroll and then declines at an accelerated rate as children drop out after a few years. This decline begins earlier and increases more sharply for girls than for boys: school participation declines by 8.9 percent per additional year of age among 12-14 year-old girls compared to 1.9 percent in the case of their male counterparts. The probability of both domestic and productive work

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[41] Marginal effects measure the percentage change (expressed on a 0 to 100 scale) in the probability of participating in a given activity resulting from a one unit increase in the explanatory variable (for continuous variables) or being in a given category versus being in the reference category (for indicator variables). These marginal effects are evaluated at the means of the covariates. Highlighted coefficients are statistically significant at the 5 percent level or less.

increases with age along the whole age spectrum (except domestic work for 15-17 aged boys) but increases significantly more rapidly in the case of productive work, particularly at early ages.

If the child is a son or daughter of the household head, he or she may be treated differently from other young relatives living with the family. He or she may have a lower probability of working and a higher probability of attending school. There is some evidence that this is indeed the case for the schooling of children aged 12-17. This suggests that the relationship with the household head may have more impact on a child remaining in school than on entering school.

A child's relationship with the head of the household may have more impact on retention than on school entry.

Parental characteristics

Overall, parental education has a significant positive effect on schooling but a negligible effect on both domestic and productive child work. The impact of parental education seems to be greater among children aged 6-11, suggesting that parental education is most important in relation to gaining access to school. The effect of the mother's education is consistently stronger than that of the father's education, except with boys aged 15-17. In fact, among all children aged 15-17, the mother's level of education is the primary determinant of girls' schooling while the father's level of education is the primary determinant of boys' schooling. The level of parental education can directly influence the allocation of children's time, mainly through income and priorities. Indirectly, it affects the bargaining power of the mother relative to that of the father in making household decisions. Even assuming equal returns to household income, this differential effect of the mother's and the father's education may suggest that women have a higher absolute preference for children's schooling than men. In addition, there seems to be some evidence that, at least at higher ages, women tend to prefer that their daughters stay in school rather than their sons. The opposite is true for men.

Among all children aged 15-17, the mother's level of education is the primary determinant of girls' schooling while the father's level of education is the primary determinant of boys' schooling.

Household sex and age composition

As they do not contribute to household income but generate demands for child care, preschool children place pressure on household resources. The expectation, therefore, is that preschool children place added burdens on other children in the household who must increase their share of child work while decreasing the time devoted to schooling. This is particularly true for females as they bear the brunt of child care responsibilities within the household. The results show that the presence of preschool children does indeed reduce the probability of going to school among 6-11 aged girls but, surprisingly, it has the opposite effect on boys of the same age.[42]

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[42] The number of pre-school children reflects fertility decisions that are determined along school-age children's time allocation. This makes this variable endogenous to child work and schooling. Thus, the results on this variable must be interpreted with caution.

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The schooling of children aged 6-14 is only negatively affected by the presence of other school-age children. Their work, however, is affected negatively by the presence of both other school-aged children and older children. This suggests that the shadow price of schooling of children aged 6-14 tends to increase as a result of:

- the competition for schooling resources from other school-aged children; and
- the reduction in the value of child work as a result of having other school-aged children, as well as older children, living in the household.

In both cases, the work of school-aged children seems to be more responsive to the presence of children of the same sex than children of the opposite sex. This finding suggests that there may be some division of labor within the household along gender lines, which is further corroborated by the results on the presence of adults in the household. Economically-active adult females and older individuals tend to ease the domestic workload of boys while relieving girls' productive work duties. The presence of economically-active adult males tends to increase the demand for domestic work among girls while easing the work responsibilities of boys. Finally, the presence of adults in the household tends to increase child schooling, particularly at older ages and among girls.

The presence of adults in the household tends to increase child schooling.

Sex of the household head and household ethnicity

Children from households headed by females (which is generally indicative of the absence of a husband and thus an indicator of household poverty and vulnerability) are neither less likely to attend school nor more likely to work than children from male-headed households.

Except among children aged 15-17, Khmer children are consistently and significantly more likely to be in school than children of ethnic minorities. Minority girls aged 12-14 are 19 percent less likely to attend school than their Khmer counterparts. There is also some evidence that, particularly at younger ages, ethnic minority children are more likely to work than Khmer children.

Khmer children are consistently and significantly more likely to be in school than ethnic minority children.

Household wealth

Household wealth has a significant impact on child schooling. In addition to making more resources available for schooling, household wealth may increase schooling by acting as a cushion against economic shocks in the absence of well-developed capital markets. The differences in enrollment rates by household wealth are more marked at early ages (6-11) and later ages (15-17). This indicates that household wealth plays a critical role in getting children into school early and allowing them access to more costly secondary schooling. This is confirmed by the results below on school entry.

The relationship between household wealth and schooling is, however, non-monotonic. For example, there are three clearly-defined groups: the lowest two wealth quintiles, the two quintiles in the middle, and, clearly distinguished from the others, the wealthiest quintile. Among boys aged 15-17, those belonging to the richest wealth quintile are almost 19 percent more likely to be enrolled in school than those from the poorest households. Only among boys at the highest levels of wealth does household wealth reduce the probability of working. By providing greater resources and increased insurance against shocks, household wealth reduces the need for child work. However, household wealth may also be associated with more child work to the extent that wealthy families tend to own productive assets, which increases the potential value of child productive work.[43] These two opposing forces may help explain why household wealth has a less significant impact on child work than it does on schooling.

In terms of wealth, there are three clearly-defined groups: the lowest two wealth quintiles, the two quintiles in the middle, and the wealthiest quintile.

Main economic activity of the household

The status and nature of the household head's employment, which determine the main source of livelihood for the household, are instrumental in determining the allocation of children's time.[44] In relation to schooling, children from households whose main income is derived from casual employment are the most vulnerable, particularly older children. This is explained by the low levels and erratic nature of income from casual employment, particularly when most of this employment is in agricultural production. Children from households whose income is mainly derived from their own farm businesses are most likely to be engaged in productive work, followed by those from households with other non-farm businesses. This indicates that child productive work is mainly related to subsistence agriculture and that the existence of household productive assets increases the value of a child's work.

Child productive work is mainly related to subsistence agriculture and the existence of household productive assets increases the value of a child's work.

Geographical area and commune characteristics

The initial differences in school participation rates between urban and rural areas disappear once one controls for differences in socio-economic characteristics between them. There remain, however, differences in the incidence and nature of child work. Child productive work is predominantly a rural phenomenon, but children in urban areas tend to compensate, at least in part, with more engagement in domestic activities.

Even after controlling for differences in household wealth, there remain differences in school participation across communes with different poverty

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[43] Recall that our household wealth measure is constructed using information from household ownership of non-productive assets as well as household living conditions.

[44] This variable may be endogenous to children's time allocation decisions if the time of the household head and that of children are good substitutes. The results on this variable should thus be interpreted with caution.

levels, but these differences are only significant for 6-14 year-old boys. Controlling for differences in poverty levels across communes, the availability and characteristics of school facilities in the commune do have an impact on child activities, particularly child work. However, by altering the time devoted to work activities, school characteristics also affect the potential time available for school activities. This change may not be reflected in changes in school participation at a given point in time (which is measured here), but it will certainly affect the chances of completing a grade and continuing in school. The school characteristics that have the most consistent effect across child activities, age groups, and gender are the education level of primary school teachers and the incidence of parental associations. Other characteristics that contribute positively to school participation include:

- the availability of LSS;
- preschool facilities;
- availability of the full primary-cycle; and
- female teachers.

In some cases, school characteristics are associated with child work in unexpected ways, as is the case with the percentage of incomplete primary schools in the commune. This may be explained by the fact that communes with certain "good" school characteristics also tend to have more opportunities for child work.

3.1.3. *Work and school entry*

This section models whether or not the child entered school at each age, starting from age 5 and continuing through age 14, inclusive. The model is fully elucidated in Appendix K.

The impact of work on school entry

Using the results from this model one can compute the impact of work on a variety of outcomes related to school entry. Since a primary interest of this report is whether a child eventually enters school, the focus is on what impact work may have on the probability of entering school by age 14.[45] In addition, given the pervasiveness of late school entry in Cambodia, the impact of work on the probability of entering school by age 6 is also examined. Table 16 reveals that work does indeed have a sizable impact on school entry, particularly productive work and particularly among boys.

Among boys, involvement in productive work reduces the probability of entering school by 25 percent, and the probability of entering by the official school entry age of 6 years by 17 percent. Thus, these results show that the positive relationship observed between school participation and productive work among children aged 6-11 is due to a combination of a

Work has a sizable impact on school entry, particularly productive work and particularly among boys.

Among boys, involvement in productive work reduces the probability of entering school by 25 percent, and the probability of entering by the official school entry age of 6 years by 17 percent.

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[45] For the purposes of these simulations, work before school entry is defined as work at every single age.

spurious relationship between school entry and work through age and the endogeneity of work to school entry.

Table 16. Effect of work on school entry, by outcome and sex

A. Productive work		
	Boys	Girls
School entry by age 14	-25.11	-8.95
School entry by age 6	-17.37	-8.90
B. Domestic work		
School entry by age 14	-12.60	-4.70
School entry by age 6	-13.23	-5.60

Notes: Reported figures measure the percentage change (expressed on a 0 to 100 scale) in the probability associated with each school entry outcome as a result of working at each age. Highlighted coefficients indicate that the coefficient associated with the work status variable in the school entry equation is statistically significant at the 5 percent level or less. See text for further details.

Both school entry and work (productive and domestic) are significantly related to age.[46] For boys and girls, the probability of entering school increases with age until age 10 and decreases thereafter, while the probability of both productive and domestic work increases continuously with age.

The probability of entering school increases with age up to age 10 and decreases thereafter.

Younger cohorts of children tend to enter school earlier, but also start working earlier than older generations. Children that are directly related to the head of household tend to enter school earlier, but also start working earlier than other children.

Parental education, particularly the mother's, increases the probability of entering school at each age but has no effect on involvement in either domestic or productive work. The only two household composition variables that affect school entry are the number of other 6-14 aged boys (negatively for both boys and girls), and the presence of economically active adults. In the case of the latter, one can observe that while the presence of female adults has a beneficial effect on girls, the presence of male adults has a beneficial effect on boys. A clear division of labor by gender and age, particularly in reference to domestic duties, is observed. Boys' work is most affected by the household presence of other 6-14 aged boys while girls' work is most affected by the presence of other 6-14 aged girls.

A clear division of labor by gender and age, particularly in reference to domestic duties, is observed.

There are no significant differences in school entry patterns between children living in female-headed households and those from male-headed

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[46] These results are not shown here but are available upon request. The estimated effects of the different covariates on school entry are conditional on work status. Each covariate has, potentially, a direct effect on school entry (conditional on work status), and indirect effect through its impact on work which in turns affects school entry.

households. However, children from female-headed households are less likely to undertake domestic work before school entry.

Khmer boys and girls tend to enter school earlier but are also more likely to do productive work before school entry. This may reflect the higher opportunities for work at early ages in Khmer households, which tend to be wealthier than those of other ethnic groups.

Household wealth is strongly related to early school entry. There is also some evidence that children from households in the top three wealth quintiles tend to start working earlier than children from households in the lowest two quintiles. Again, this latter observation may reflect the increased opportunity for work among wealthier households.

As regards the main economic activity of the household, children in households where most of the income is generated from casual employment tend to enter later than others. Boys from households whose main income is derived from regular employment enter school earlier than other boys.

Children in households where most of the income is generated from casual employment tend to enter school later than others.

Urban boys tend to enter school earlier than rural boys, but this is not the case for girls. There are no significant differences in work patterns by geographical area.

Especially in the case of girls, school characteristics have a more robust effect on school entry than on current school participation. Early school entry is encouraged by the staffing of better-educated teachers and the existence of parental associations. Early entry is also positively related to access to and completeness of primary schools, the availability of preschool facilities, teacher guides, and the female composition of the teaching force. As regards work, better educated teachers are negatively related to work but work is positively associated with factors such as access to primary schools and availability of preschool facilities. This may indicate the fact that communes with certain good characteristics in terms of school environment also offer more opportunities for work at early ages.

Especially in the case of girls, school characteristics have a more robust effect on school entry than on current school participation.

3.1.4. *The impact of delayed school entry on subsequent schooling outcomes*

The analysis above shows that work contributes, as do other structural factors, to the observed late school entry phenomenon in Cambodia. Next, the results from the school-level analysis are complemented by showing why this is important; that is, an attempt is made to measure the effect of delayed school entry on subsequent schooling outcomes. The following three outcomes are the focus:

- current school participation status conditional on having entered school (i.e. whether a child that entered school is still enrolled);
- completion of primary school; and
- the number of completed years of schooling.

A caveat to the previous analysis is that it did not include school dropouts, so the results are not entirely representative of the population of children aged 6-17.[47] Overall, the results reiterate the fact that girls' school entry is more responsive to the presence of other household members and to the schooling environment. The only two differences that emerge are:

- the presence of adults (only economically-active males in the case of boys) reduces the school entry age of children. The presence of other children aged 6-14 does not; and
- the existence of a LSS in the commune encourages girls to start school earlier.

These findings again highlight that late school entry is not simply a temporary phenomenon following a period of rapid expansion in the education system. School entry age is strongly related to structural factors that are likely to continue resulting in late school entry unless appropriate actions are taken.

School entry age is strongly related to structural factors that are likely to continue resulting in late school entry unless appropriate actions are taken.

From this model, the estimated school entry age for all children that have entered school is computed. [48] These predicted values are then used as an additional covariate in the model for each of the three school outcomes mentioned earlier.[49] This two-stage estimation method allows us to impute school entry age for all children who have entered school and to estimate the effect of school entry age on subsequent schooling.[50]

Appendix P demonstrates the results of the model.

Table 17 reveals that school delay has a sizable negative impact on the subsequent schooling experiences of children, although these effects are only statistically significant in the case of girls. For each additional year that a girl delays school entry, her chances of remaining in school are 6

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[47] See Appendix O for more detail.

[48] For the sake of simplicity, none of these models controls for the fact that we are selecting the sample of children that entered school out of the whole population of 6-17 aged children. Thus, the results are only representative of the subpopulation of children that had entered school by the time of the survey.

[49] In technical terms, the model being estimated for remaining in school is a probit model. In the case of primary school completion, we also estimate a probit model excluding those children who are still attending primary school. In the case of the number of completed years of schooling, we also account for censoring and estimate an interval regression tobit model. In particular, for those children who are still attending school, the number of completed years of schooling is equal to or greater than the number completed thus far. The results from these models are not presented here but can be obtained upon request.

[50] Ideally the model for school entry would include some factor that affects school entry age but not three school outcomes conditional on school entry age. In practice, however, we do not have such a factor so identification of the effect of school entry age on these three school outcomes only relies on the no-linearity of the predictor function for school entry age. Thus, the results presented here need to be interpreted with caution.

percent lower, her chances of completing primary school are 60 percent lower, and her total number of completed years of schooling are reduced by 3 years.

Table 17. Effect of delayed school entry on subsequent schooling, by outcome and sex

	Boys	Girls
Remaining in school	0.05	-6.07
Completing primary school	-29.38	-59.95
Completed years of schooling	-2.00	-2.99

Notes: Reported figures measure the percentage change (expressed on a 0 to 100 scale) in the probability associated to the schooling outcome (in the case of remaining in school and completing primary school), or the change in the number completed years of schooling, as a result of each additional year of delay in entering school. See text for further details. Highlighted coefficients are statistically significant at the 5 percent of less.

3.1.5. *Conclusions and policy implications*

Child work is widespread in Cambodia and starts at a very early age. The time devoted to such work, and its contribution to the livelihood of the household, are far from negligible. This has potentially negative consequences on child health and schooling. With regard to schooling, the value of child work generates an important indirect cost that outweighs all direct costs of schooling combined (see next section). Child work can potentially interfere with education by reducing the time available for school activities and by reducing school performance as a result of physical exhaustion.

In this respect, the schooling, productive work, and domestic work activities of Cambodian children are found to be strongly interrelated from a very early age. School and work activities are largely substitutes, particularly school and productive work. The trade-off or degree of substitution between school participation and productive work increases rapidly as the child grows older. This is particularly true of girls, whose schooling at ages 15-17 is more likely to be displaced by productive work than that of boys the same age. However, a strong negative relationship between school and work is already apparent at a very early age. Beyond the association between work and school dropout, work tends to cause a delay in school entry and may prevent it altogether − particularly productive work and among boys. This delay in school entry has sizable negative consequences on the subsequent schooling experience of children, particularly among girls.

In most cases, the parental decision to put their children to work is the rational response to the environment in which work and schooling decisions are made. Hence, effective policies should be aimed at influencing the incentive structure of parents. In this context, setting administrative limits on child labor is not likely to produce the intended

School delay has a sizable negative impact on the subsequent schooling experiences of children, although these effects are only statistically significant in the case of girls.

Child work is widespread and children become involved in it at a young age.

effects even if these limits could be enforced.[51] The results presented here suggest that school incentive schemes that provide cash or in-kind subsidies to poor children and are conditional on school attendance offer a promising route. Such incentive schemes may increase schooling directly by providing poor families with additional resources, as well as indirectly by compensating parents for the foregone economic product from their children's lost labor. In this case, the economic incentive is a substitute for the value of the product derived from child work. This substitution effect, induced by subsidy, may be reinforced by further conditioning the subsidy on attending an after-school program which would effectively reduce the time available for work. These subsidies are different from a general transfer to the household in that they are conditional on some behavior on the part of children such as minimum school attendance standards or the previously mentioned after-school program attendance. The results on household wealth presented above indicate the need to target the poor with such subsidies and suggest the possibility of a significant direct effect of subsidies on schooling.

School incentive schemes that provide cash or in-kind subsidies to poor children and are conditional on school attendance offer a promising route.

The results also suggest that the effectiveness of such a demand incentive scheme would be greatly increased if it were accompanied by efforts to improve the adverse environment faced by working children. Specifically, the results show that many of the factors that increase the chances of working also reduce the likelihood of going to school. Finally, the results indicate that early school entry improves a child's subsequent schooling performance and reduces the chances of work preventing school entry altogether.

3.2. Private Direct Costs of Basic Education

This section completes the analysis of household education costs by examining the scope and nature of private direct costs of basic education. It also examines how these relate to household wealth in determining schooling outcomes. The analysis below draws mainly from a recently conducted study on private costs of primary and lower secondary education, which was commissioned as part of this report (Bray and Seng, 2004) and undertaken in collaboration with MoEYS.

This study builds on earlier work conducted in 1997/98 on private costs of primary education (Bray, 1999), which provided important input to education policy in Cambodia. In order to examine changes over time, the 2004 study focused on the same 77 primary schools (and their communities) that were surveyed in 1997/98. These were supplemented by 39 lower secondary schools that fed from these primary schools. Although not strictly nationally-representative, the sample of schools covered 11 provinces as well as Phnom Penh and two types of socio-economic environments, urban and rural, in each province. Three main data instruments were employed:

- questionnaires administered to school directors and teachers;

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[51] Recall that most child work occurs in the form of unpaid family labor.

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- focus group discussions with primary teachers, secondary teachers, parents, and lower secondary pupils; and
- in-depth interviews with pupils for information validation.

In addition to information on household costs, data were collected on other sources of school finance as well as on perceptions about PAP and the recently introduced scholarship program.[52]

For the purposes of this report, household costs are divided into eight categories:

- registration and record books;
- uniforms and equipment;
- learning materials;
- supplementary tutoring;
- tests and examinations;
- transport;
- pocket money; and
- other expenses.

While expenses for registration and record books are considered in-school costs, the others are mainly out-of-school costs. Some costs are incurred at the beginning of the school year while others are incurred during the school year. Pocket money and transport are commonly omitted from estimates of the costs of education but are included in this study because households perceive them to be part of the total cost of education. Adjustments have been made to account for the fact that not all costs related to transport, pocket money, and uniforms have an educational content.

Education costs are calculated as averages for the pupils of specific grades in specific schools. Since expenditures vary according to the household standard of living, these averages are weighted. For example, the cost of bicycles is weighted by the proportion of children with bicycles. The data do not, however, allow us to examine variations of education costs by household expenditure levels, which is of paramount importance for education policy.[53]

The 1997/98 study revealed a very heavy burden of education costs on households. In particular, households and communities were meeting an estimated 60 percent of the total resources for primary schooling. According to alternative data sources at the time, this cost burden was reportedly much lower, but still high, at 37 percent (World Bank and

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[52] See Bray and Seng (2004) for details on sampling design, data collection, and data construction.

[53] Data from the ongoing Cambodia Socio-Economic Survey (HSES 2004) could be used to get an up-to-date picture of the share of education expenditures in total household expenditures for different expenditure quintiles, and thus compare the burden of education for different socio-economic groups.

ADB, 2003).[54] Using data from the 1997 Cambodia Socio-Economic Survey, the average schooling expenditure per primary school child accounted for 26.2 percent of non-food spending among poorest households and 11.9 percent among the wealthiest. These figures rose to 56.2 percent and 26.2 percent, respectively, in the case of secondary schooling costs. Household direct costs have since been reduced as a result of the introduction of PAP in 2000. PAP provides schools with public resources that partially compensate for the removal of school charges for registration, learning materials, and tests − particularly at the primary level. However, these expenses were always small relative to other household costs such as uniforms, pocket money, transport, and supplementary tutoring. As a result, despite government efforts, household costs of schooling remain substantial. The most taxing expenditures are in the form of pocket money, transport, and supplementary tutoring, and are even more significant at the lower secondary level (Table 18 and Table 19).

Household direct costs have been reduced as a result of the introduction of PAP in 2000.

Household costs per student increase rapidly with grade within each school level, particularly in the last grade of each level, but the greatest proportional increase is observed in the transition between primary school and LSS. For example, in rural areas, primary school costs stand at CR 92,400 (US$23.1) in grade 6, but then almost double in grade 7 to CR 165,700 (US$41.4). Finally, they peak in grade 9 at CR 245,200 (US$61.3). Not surprisingly, household costs are much larger in urban areas than in rural areas, where the majority of the population resides and most schools are located. Expenditure patterns vary by region, with expenditure for supplementary tutoring being more significant in urban areas than in rural areas, especially at the primary level. However, pocket money and transport costs are consistently more prominent in primary schooling (except in urban areas where tutoring ranks second). Pocket money and tutoring are the most costly items in secondary education.

Household costs remain substantial, particularly in the form of pocket money, transport and supplementary tutoring.

The 2004 survey found evidence of a few persisting school charges, but these were small. In general, the Government appears to have been successful in replacing start-of-year expenditures with PAP financing. However, enforcing the removal of school fees has been much more effective at the primary level than at the lower secondary level. A recent report notes that, compared to primary schools, LSSs appear to have much less financial accountability to local communities and tend to operate like small corporations with a profusion of arbitrarily-set fees (MoEYS and KAPE 2001, p.17).

The Government has successfully replaced start-of-year expenditures with PAP financing.

Supplementary tutoring that operates as a sort of shadow system alongside the mainstream, consumes considerable household resources, especially in urban areas and particularly in key final grades. Expenditures vary from one grade to another, peaking in primary school at grade 6 and in lower secondary school at grade 9. Some rural primary schools have no tutoring in grades 1 through 5 but do in grade 6. This is especially important as the

Supplementary tutoring acts as a shadow system alongside mainstream schooling, and places considerable cost burden on the household.

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[54] In calculating this estimate, most out-of-school costs are not considered.

final grade of primary school serves as a determinant of entry into lower secondary school.

Whereas in primary school tutoring usually covers the whole curriculum, in lower secondary school it is specialized by subject.[55] In Cambodia, much of the tutoring takes place in the students' own schools and is provided by their own teachers. Thus, when the official school day ends, the unofficial school day begins – with the same teachers and the same pupils occupying the same desks in the same classrooms. This situation creates an environment potentially conducive to exploitation, where teachers deliberately cover only part of the standard syllabi during mainstream classes in order to promote demand for their after-school private lessons.

The government has long been ambivalent about private tutoring and in the mid-1990s, and under the current ESP revision framework, even endeavored to prohibit the practice. In any case, prohibition will be difficult to enforce unless the root cause behind supplementary tutoring is tackled. Any policy on tutoring must therefore be linked to changes in teacher remuneration but must also consider the factors driving the demand for tutoring (e.g. grade 9 exam). On the official salary scale in 2003, experienced teachers were earning just CR 113,000 (US$29) per month in primary schools, and CR 154,000 (US$37) in LSSs. At the 1999 poverty line, a primary school teacher in Phnom Penh would be living below the poverty line if he or she had to support even one additional person on an official teacher salary. A LSS teacher would only be able to support him- or herself plus one additional person without falling below the poverty line. Teachers outside of Phnom Penh have lower costs of living but are still far from well-paid. When salaries are so low that teachers cannot feed their families on their official earnings, teachers are compelled to find ways to supplement their incomes. Private tutoring is more widespread in urban than rural and remote areas not only because urban societies are more competitive, but because living costs are higher and teachers are under more pressure to secure supplementary incomes. The low level of teachers' salaries has been an issue since the early 1990s and has been raised more recently in the context of the Civil Service Reform Plan.

Any policy on tutoring must be linked to changes in teacher remuneration.

Education costs are substantial both in absolute and relative terms, particularly for the poor. First, there is a heavy burden on the poor. As a percentage of the 1999 poverty line, household education costs in rural areas range from 5.3 percent in grade 1, to 14.2 percent in grade 6, 25.5 percent in grade 7, and 37.8 percent in grade 9 (Council for Social Development, 2002). These figures are substantial and help to explain the large differences in schooling by household wealth found earlier, particularly in successfully completing the last grade of primary school and in gaining access too LSS. Second, average household contributions

Household education costs in rural areas range from 5.3% in grade 1, to 14.2% in grade 6, 25.5% in grade 7, and 37.8% in grade 9.

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[55] The four most popular subjects are mathematics, physics, chemistry, and Khmer literature, and in urban areas many pupils take classes in English. Tutoring fees vary by subject, with fees for mathematics and physics being the highest: about 500 riels per hour in urban areas, and 300 to 400 riels in rural areas.

per child are greater than any other recurrent fund received at the school level.

Table 18. Average yearly household costs per pupil by grade and region, primary school (CR)

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Urban Areas						
Registration and record books	200	200	2,500	900	400	2,500
Uniforms and equipment	16,900	17,100	17,600	21,300	21,900	23,900
Learning materials	7,700	9,600	12,100	15,400	17,300	20,000
Supplementary tutoring	21,000	21,500	32,600	38,100	40,700	48,700
Tests and examinations	100	100	800	800	800	900
Transport	11,200	11,200	18,500	25,500	28,600	33,000
Pocket money	57,900	60,300	61,800	68,300	76,000	82,300
Other expenses	1,900	1,900	2,000	2,100	2,200	2,900
Total	*116,900*	*121,980*	*147,900*	*172,500*	*187,900*	*214,200*
Rural Areas						
Registration and record books	100	100	200	1,400	200	2,300
Uniforms and equipment	11,700	12,000	12,700	16,000	16,700	17,100
Learning materials	5,000	6,200	8,700	10,300	12,200	14,400
Supplementary tutoring	0	0	0	0	0	3,300
Tests and examinations	0	0	0	0	0	0
Transport	0	0	5,400	12,900	19,000	23,100
Pocket money	25,400	27,700	28,400	41,700	44,000	46,300
Other expenses	400	400	600	700	700	700
Total	*42,500*	*46,200*	*56,000*	*83,200*	*91,900*	*107,200*

As regards government funds, for example, salary receipts per pupil are CR 39,100 in primary education and CR 86,200 in secondary education, while PAP funds per pupil are CR 4,962 and CR 12,197 respectively. The gap between household and government financing has been reduced but households continue to meet more of the total costs of education than the government. In 2004, out of the combined resources of households and government, households had contributed 55.6 percent compared with an even larger 76.9 percent in 1997/98. In lower secondary schools during 2004 the gap was wider than in primary schools, with households financing 65.9 percent of education costs. According to alternative sources (World Bank and ADB, 2003), the parental share in total educational expenditure remained high in 2002 and has decreased only slightly from 37 percent to 34 percent. The heavy burden of direct education costs on households is partly a reflection of the government's inability to amass resources through the tax system despite recent improvements.[56]

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[56] The ratio of tax revenue to GDP is 8.4 percent, which is among the lowest in the world. Other Asian countries that have a high household burden of education costs include: Myanmar (Mehrotra & Delamonica 1998), Vietnam (Truong et al. 1999),

Table 19. Average yearly household costs per pupil by grade and region, LSS (CR)

	Grade 7	Grade 8	Grade 9
Urban Areas			
Registration and record books	4,500	2,600	2,700
Uniforms and equipment	42,300	42,300	42,600
Learning materials	27,100	31,000	36,300
Supplementary tutoring	66,000	81,700	211,400
Tests and examinations	15,200	15,200	21,300
Transport	37,400	37,500	37,900
Pocket money	182,900	190,400	203,500
Other expenses	3,800	3,800	3,800
Total	*379,300*	*402,700*	*559,500*
Rural Areas			
Registration and record books	2,600	800	900
Uniforms and equipment	25,800	26,700	26,700
Learning materials	17,500	19,900	24,500
Supplementary tutoring	15,300	17,100	63,500
Tests and examinations	2,100	2,100	9,100
Transport	35,000	35,000	35,000
Pocket money	91,100	96,900	113,400
Other expenses	1,900	2,000	2,100
Total	*191,300*	*200,600*	*275,200*

The heavy education burden that Cambodian households bear calls for further efforts to reduce costs barriers, for poor families in particular. Some families and communities are both able and willing to share the costs of basic schooling, and the education system benefits when they do so. Research shows increased feelings of ownership and buy-in of schools which are, at least in part, locally financed. Contributions at the community level also foster greater accountability as community members have a vested interest (Suzuki 2002, pp.161-168). Another benefit is that such contributions enlarge the overall resource base for education, which is critical in Cambodia given its thin tax system. But education cost-sharing should be strictly on a voluntary basis so as not to have a deleterious effect among more economically disadvantaged children. In other words, community contributions by those who can afford them can allow government resources to be better targeted to serve disadvantaged groups who cannot. The benefits of this approach were realized by the governments of Tanzania and Zambia when they launched their free-education schemes in 2001 and 2002 respectively.

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and parts of China (Bray et al. 2004). Comparable issues of household burden exist in Africa and other parts of the world.

Although direct household costs are not as high as indirect costs from child work and, in the case of girls, marriage, they both increase with age/grade. As seen earlier, the opportunity costs of schooling as measured imperfectly by child wages range from CR 1,594 among children aged 6-11, to CR 4,354 among children aged 15-17. Since children tend to enter school late, they reach "maturity" in terms of the value of their time by the end of primary school or beginning of LSS. This coincides with the time period at which they also experience the greatest increases in direct education costs. This helps to explain the bottleneck in the education system starting in upper primary education and moving into LSS, especially in relation to the poor.

Thus, the direct and indirect household costs of education reinforce each other to produce a critical barrier for the poor. This is especially true in upper primary and the transition into LSS.

The direct and indirect household costs of education produce a critical barrier for the poor in upper primary and going into LSS.

3.3. Private Benefits of Basic Education

When parents consider whether or not to send their children to school, they consider not only the direct and indirect costs of doing so, but also the associated benefits to their children or to themselves. Chief among private benefits are the labor market returns to education. Based on a small survey of primary and lower secondary schools in Cambodia, and accompanying focus group discussions with teachers, parents, and children, Bredenberg (2003) observes some of the realities particular to the more remote rural areas of the country. In these areas, parents and children recognized the fact that their communities offered no alternative jobs to farming. Thus, regardless of education level, a child would eventually become involved in farming. Children who never attended school or who dropped out early would have the same economic standing as children who completed the full cycle of basic education. The incentive for attaining an education was predictably low. Expenditures of time and financial resources on secondary education could only be a viable investment for those who had the means and opportunity to migrate elsewhere; otherwise, such investments were superfluous.

Using data from the most recent 2001 Labor Force Survey, Ridao-Cano (2004) finds large private returns in terms of current labor market outcomes in the form of wages/earnings and employment-related outcomes. By school level completed, Table 20 reports the estimated probabilities of being engaged in paid employment, working in the wage sector, and holding a permanent job.[57] The returns to schooling in terms of paid employment are sizable and increase with school level, but at a decreasing rate. There are no returns to primary schooling in terms of

The returns to schooling in terms of paid employment are sizable and increase with school level.

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[57] All returns to schooling estimates are based on the 2001 Labor Force Survey and are derived from models that also include controls for experience, gender, geographical area, and economic sector (in the case of the models for earnings). The returns in terms of labor force participation or employment are not considered since labor force participation rates in Cambodia are very high and almost all individuals in the labor force are employed. See Ridao-Cano (2004) for details.

working in the wage sector (as opposed to the lower premium and more temporary self-employment sector). Returns to higher levels of schooling, however, are sizable and rise at an increasing rate, particularly beyond lower secondary education. More-educated workers are also more likely to have permanent jobs than less-educated workers, although there are no significant differences beyond basic education.

Table 20. Estimated distribution of employment-related outcomes by school level completed (%)

	None	Primary	L. Sec	U. Sec	Tertiary
Paid employment (vs. unpaid)	56.2	66.6	72.9	85.4	95.8
Wage employment (vs. self-employment)	27.0	25.9	32.3	55.5	90.8
Permanent employment (vs temporary)					
Wage sector	64.2	84.7	93.4	98.7	99.3
Self-Employment	33.4	38.9	47.1	54.2	

Source: Ridao-Cano (2004)

Table 21 reports the estimated distribution of monthly wages and earnings by school level completed.[58] Wage returns to schooling increase with school level, but this is more notable at the lower and upper ends of the wage distribution. The same overall picture emerges in relation to earnings, although here the proportional differences across school levels are higher along a broader portion of the earnings distribution.

The estimated returns to schooling reflect the scarcity of workers with even a low level of education. This dearth of educated workers explains why even primary school completion carries large returns. In the region, Cambodia has the lowest percentage of an adult population with some school level completed (30 percent), and the second highest illiteracy rates after Laos (63 percent). On the other hand, the demand for skilled and educated workers in the current labor market is weak. Thus, while the current labor market opportunities for educated workers are limited, particularly in rural and remote areas, education carries a large premium.

In terms of social returns to education, while the low supply of skilled and educated workers in the labor market does not place a serious constraint on the current economic model in Cambodia, it may restrict the development of new sources of economic growth. If the Cambodian economy is to gradually move towards the production of goods with higher skill content,

Cambodia has the lowest percentage of an adult population with some school level completed (30 percent), and the second highest illiteracy rates after Laos (63 percent).

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[58] The information on wages/earnings in the LFS is only provided in income brackets rather than continuously. To control for differences in wages and earnings due to varying hours of work, we include weekly hours of work as an off-set (i.e. as an independent variable with coefficient equal to one).

immediate actions are needed to improve the stock and quality of education. This is particularly true if this move is intended to result from the development of modern and diversified agricultural and non-farm rural sectors. It is equally true if the Government aims to implement an industrial development strategy based on the establishment of industrial zones near the border areas. An economic model based on these new sources of growth requires a deepening of the education base that must start from the bottom, that is, by providing quality basic education for all. Thus, while the expansion of basic education results in significant private labor market returns, there are also substantial macro benefits in terms of sustained economic growth and poverty reduction through the development of new sources of growth.[59]

Table 21. Estimated wage and earnings distribution by school level completed

A. Wage distribution (employees)						
	None	Primary	L. Sec	H. Sec	TVET	University
< 49,999R	16.07	11.31	8.96	6.56	6.21	3.19
50,000R-99,999R	32.19	28.39	25.76	22.32	21.72	15.23
100,000R-149,999R	18.37	18.56	18.29	17.55	17.38	14.87
150,000R-199,999R	17.64	19.87	20.87	21.66	21.75	21.57
200,000R-299,999R	9.86	12.66	14.35	16.32	16.64	19.44
300,000R-499,999R	4.53	6.74	8.33	10.53	10.92	15.43
> 500,000R	1.35	2.45	3.43	5.05	5.38	10.25
A. Earnings distribution (self-employed workers)						
	No school	Primary	L. Sec	H. Sec		
< 49,999R	24.43	19.93	14.51	6.80		
50,000R-99,999R	32.37	30.73	27.47	18.95		
100,000R-149,999R	15.07	15.76	16.10	14.44		
150,000R-199,999R	13.69	15.33	17.27	18.94		
200,000R-299,999R	6.77	8.11	10.04	13.38		
300,000R-499,999R	5.96	7.68	10.58	17.67		
> 500,000R	1.70	2.47	4.04	9.82		

Notes: Extracted from Ridao-Cano (2004). TVET refers to technical and vocational education and training.

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[59] Alternatively, we can also view these benefits as the cost of not doing anything and maintaining the status quo in education.

CHAPTER 4: Lessons from Policy Interventions in Cambodia

The analysis thus far has provided a general characterization of how demand and supply factors are related to student outcomes. The results of the analysis have clear policy implications and, as many of the factors discussed in this report are susceptible to specific policy interventions, they have been repeatedly dissected in order to draw inferences for future policy planning. This chapter, then, complements the previous analysis by exploiting the valuable lessons from past and ongoing demand-side and supply-side interventions in Cambodia. In addition, this chapter also provides some international experiences with such interventions.

The chapter begins with a general description of the recent trends in education policy. The performance of specific interventions is then examined in the context of the available evidence.[60] Lessons are drawn from recent systemic education reform efforts, as represented by PAP basic education package. On the supply side, a school quality improvement intervention is examined as implemented by the Education Quality Improvement Project financed by the World Bank. Finally, a demand-side scheme is considered through a pilot scholarship program for girls and ethnic minority children financed by the Asian Development Bank Japan Fund for Poverty Reduction (JFPR/ADB).

4.1. Education Policy in Cambodia

Recent trends in public expenditures in education

During the 1990s, the proportion of the government budget allocated to education was very low by international standards. For example, during the period 1994-97, education was budgeted to receive between 8.4% and 9.6% of total government spending, and in real terms funding for education from government sources fell between 1995 and 1997 (Pheng et al., 2001). In most countries of the region, education was allocated well over 10%, and in a few countries the figure exceeded 20% (Bray, 2004). Further, in Cambodia actual expenditures on social services were often lower than the budgeted amounts. By contrast, defense and security received 204% of their budgeted allocation in 1994, and 106% in 1997 (Pheng et al., 2001).

This pattern was radically altered at the end of the 1990s and, most prominently, from 2000 onwards. As a share of GDP, government

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[60] The balance between supply-side and demand-side interventions in this chapter does not reflect any pre-judgment on the appropriateness of one over the other. Rather, it is based on the actual balance of policy interventions in Cambodia, and the information available on these interventions. In any case, the programs considered here are by no means the only ones in Cambodia, and more efforts should be devoted to the evaluation of other programs.

spending in education more than doubled from 0.9 percent to 2 percent between 1997 and 2002, while its share in total government expenditures increased from 7 percent to 12 percent (World Bank and ADB, 2003). This greater public commitment to education has resulted in an increase of the Government share in total educational expenditures (from 21 percent in 1997 to 50 percent in 2002). The parental burden of education costs is still high but has decreased slightly from 37 percent to 34 percent. The share of external funding has fallen from 41 percent to 16 percent. Furthermore, there has been a shift in favor of recurrent spending vis-à-vis capital expenditures from 58 percent to 84 percent between 1997 and 2002. During this period, basic education has received between 80 percent and 84 percent of RGC recurrent expenditure annually in education.

Education reform in Cambodia

This increase in public resources devoted to education, particularly recurrent expenditures in the basic education sector, reflects a major shift in the education sector strategy of the RGC. During the early and middle 1990s, the country and its major donors invested millions of dollars in supply-side interventions such as textbooks, infrastructure, and teacher training. Still, participation and flow rates at the primary level continued to stagnate throughout this period. As mentioned earlier, a new wave of educational reforms at the primary school level, known generically under the name PAP (Priority Action Program), was launched in 2000. First implemented on a pilot basis, it was launched in 10 provinces on a budget of CR 10 billion. PAP shifted the focus of education policy towards demand-side factors. In particular, a specific purpose of this pilot was "to reduce the cost burden on the poorest families to increase participation of their children in grades 1-9" (MoEYS 2001, p.1). These measures have included the removal of registration and other school fees, remedial classes, and grants to schools for pre-determined operational expenditures to replace school charges previously imposed on households.

The increase in public resources devoted to education reflects a major shift in the education sector strategy of the RGC.

The scheme was expanded to cover the whole country in 2001, and broadened to encompass focus on other parts of the education system. In 2004, there were 12 PAPs with a budget of CR 75 billion.

PAP shifted the focus of education policy towards demand-side factors.

PAPs that specifically refer to the basic education sector include:

- *PAP 1: Education Service Efficiency*. This program focused on providing equitable access and improved quality and efficiency of education service through improved utilization of MoEYS personnel. Allowances were given through PAP 1 to teachers in hardship postings, such as those where ethnic minorities reside, and to teachers responsible for multi-grade and double-shift classes.

- *PAP 2: Primary Education Quality and Efficiency*. The first component of this program aimed to increase enrollment through the provision of school operational budgets. These grants were meant to replace start-of-year fees, which were abolished at the same time grants were introduced. Guidelines for use of operational budgets were

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designed to ensure availability of school supplies, encourage minor repairs, and improve the overall school environment. A second component of the program aimed at reducing repetition in grade 1 through the provision of remedial classes in the summer months, for which teachers received financial remuneration.

- *PAP 3: Secondary Education Quality and Efficiency.* This program included provision of school operating budgets to over 550 lower secondary schools. The operational budgets were linked to MoEYS policy for abolishing start-of-year fees, as a strategy to reduce the burden on parents and to enhance equitable access.

- *PAP 12: Scholarships and Incentives for Equitable Access.* A major component of this program is a scholarship scheme for lower secondary students in poor areas. Budget allocations for this program began in 2003-04.

In addition, the Government has launched a systematic program to decentralize education services. This is being supported by capacity-building efforts at the provincial, district, cluster/commune, and school levels. These efforts have been directed mainly at the effective planning, management, and monitoring of PAPs.

The Government has launched a systematic program to decentralize education services.

On the supply side and in addition to PAP funds, primary schools in Takeo, Kampot, and Kandal provinces have received cash grants through the Education Quality Improvement Project (EQIP). The project was launched in Takeo on a pilot basis in 1998/99 and gradually expanded to cover all schools in Takeo, Kampot, and Kandal provinces from 2000/01 until 2002/03. These 3 provinces account for approximately 23 percent of the primary school population in the country. EQIP grants differ from PAP grants in that the former could be invested in priorities determined by the participants as part of their school cluster development plans, while the use of the latter is largely predetermined at the central level. To support the development of school grant proposals, district level facilitators have provided technical assistance to upgrade school management capacity.

On the demand side and in addition to PAP interventions, in-kind school subsidies have been provided through the School Feeding Program (SFP), which was introduced in 1999 with support from the World Food Program (WFP). This intervention began on a trial basis in 1999 in Takeo and gradually expanded to over 700 schools in 7 provinces in the 2003/04 school year.[61] Starting in 2003/04, the SFP operation areas shifted to accommodate a refined poverty targeting. The SFP provides school children a daily on-site cooked breakfast complemented with other non-food items (e.g. vegetable seeds, hoe-heads, battery lamps, and construction materials for classroom rehabilitation). Participating schools are required to provide fresh vegetables, water, fuel, and kitchen and food storage facilities. Volunteers who prepare breakfast receive a daily food

In-kind school subsidies have been provided through the School Feeding Program (SFP).

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[61] Takeo (1999), Kampot (2000), Kampong Cham (2000; 2001; 2002), Kampong Thom (2002), Kampong Speu (2002), Prey Veng (2002), and Siem Reap (2003).

ration. An additional dry take-home ration will be piloted beginning in the 2004/05 school year for girls in the last two years of the primary school cycle. Through collaboration with the Ministry of Health (MoH), WHO, and UNICEF, a de-worming initiative to control parasite infections has been included in the program, with distribution of tablets conducted twice a year following a MoH protocol.

In terms of cash school subsidies, PAP 12 has been integrated with two other donor-funded scholarship programs at the lower secondary level: the JFPR/ADB scholarship program for girls and ethnic minority children, and the scholarship component of the Belgian Technical Cooperation (BTC) education aid package. These are expected to run through the 2005-06 school year. In 2003-04, PAP 12 was expected to provide 30 scholarships to each of 215 lower secondary schools in 16 provinces. This amounted to 6,450 scholarships, of which 60 percent were designated for girls and 40 percent for boys. The JFPR/ADB program targeted 93 LSSs in 21 provinces in 2003/04. In 75 of these schools, scholarships are only available for girls, while in the remaining 18 schools, 60 percent of scholarships are designated for girls and 40 percent for boys. The program provides 75 scholarships to each school: 45 in Grade 7 and 30 in Grade 8. The scholarship program of the BTC targets 80 LSSs in three provinces: Kampong Cham, Siem Reap, and Otdar Meanchey. It provides 30 scholarships for grade 7 with 60 percent for girls and 40 percent for boys. These new scholarship programs were preceded and inspired by smaller-scale scholarship programs operated by NGOs. These programs cover between 8,000 to 10,000 children at both upper primary and secondary school levels in selected locations (KAPE-ADB, 2001).

Table 22. Cash school subsidies

Scholarship Program	**PAP 12**	**JFPR/ADB**	**BTC**
No. of schools	215 LSSs	93 LSSs	80 LSSs
No. of scholarships	30 scholarships	6975 scholarships	30 scholarships
Distribution of scholarships	60% for girls 40% for boys	• in 75 schools: 100% for girls • in 18 schools: 60 % for girls 40% for boys	60% for girls 40% for boys

In addition to PAP and related programs, the Government has been pursuing an Education Facilities Development Program to increase and improve the supply of primary and lower secondary school facilities.

4.2. Education Reform Lessons: PAP Basic Education

School grants for operational expenditures represent the main source of PAP funding for primary and lower secondary schools. School operational budgets were designed to compensate schools for the removal of start-of-the-year fees. Grant amounts are based on two components:

- a fixed amount per school (CR 500,000 for primary schools and 1,000,000 in LSSs), and
- a per capita allocation assigned on a per pupil basis (CR 6,000 for primary schools and CR 13,600 for LSSs), where the number of pupils is determined by the preceding school year enrollment as reported by the school.[62]

School grants for operational expenditures represent the main source of PAP funding for primary and lower secondary schools.

The use of these grants is predetermined at the central level for school supplies, minor repairs, and improvement of the overall school environment. In addition, primary schools also receive funds for summer remedial classes. These funds are mainly ear-marked for teachers in the form of over-time payments and in-service orientation in remedial program delivery. School funds for remedial classes are based on the number of grade 1 repeaters at the end of the preceding academic year, as reported by each school.[63] Primary schools only in 10 provinces were eligible for PAP 2 in 2000, but by 2001 all primary and LSSs in the 24 provinces were eligible.

The two main Government objectives associated with these programs are to:

- reduce the cost burden on the poorest families and thus increase participation of their children in grades 1-9 (through the removal of start-of-year fees and by compensating school operating budgets to replace income from these fees); and
- improve the internal efficiency of basic education so that students can progress more quickly and effectively through the primary grades 1–6 (through the provision of remedial classes to weaker students during the school vacation).

In evaluating the performance of these PAP programs, the main question is how well these programs fare against their stated objectives. Ideally, the answer to this question requires a comparison between what happened with these programs in terms of enrollment and repetition, for example, and what *would have* happened in the absence of those programs. It is of course impossible to state what would have happened without these programs, so an estimate must suffice. A detailed explanation of the method employed in this estimation can be found in Appendix O.

The PAP basic education package has played an important role in the removal of school fees and in the provision of accompanying school operational budgets

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[62] The Government has sought to introduce a third component based on the commune poverty level where the school is located, as measured by the WFP poverty index, but this has not yet been implemented.
[63] A remedial class must have a number of students between 30 to 40, although classes slightly below 30 are also accepted.

It is very difficult to ascertain how much of the recent improvement in enrollment rates, particularly at the primary level, can be attributed to the various PAPs, or PAP package as a whole.[64] However, it is safe to say that overall, PAP basic education package has played an important role in this improvement, particularly as to the removal of school fees and the accompanying school operational budgets.[65]

Removal of school fees

The Government appears to have been largely successful in replacing school fees with PAP school grants. As mentioned earlier, before their official removal, school fees accounted for a small part of the total direct private cost of basic education. However, international evidence suggests that school fees form a psychological as well as practical barrier. In Peru, for example, Ilon and Moock (1991) found that parental decisions were very sensitive to the level of school fees and much less sensitive to ancillary costs such as books and uniforms. Fair (1998) found a similar pattern in Namibia; and Kadzamira and Rose (2003) reported a comparable pattern in Malawi. In fact, the abolition of start-of-year fees was considered *the* most important school policy change by parents of both primary school and LSS students. Teachers, particularly primary school teachers, ranked it as one of the most important (MoEYS, 2002c).

The Government appears to have been largely successful in replacing school fees with PAP school grants.

Parents considered the abolition of start-of-year fees the most important school policy change.

The removal of charges would have little effect if not properly enforced. In the case of Cambodia, this change in policy was publicized at both national and local levels. At the local level, village leaders disseminated information to households and encouraged parents to enroll their children in school. Such publicity again has parallels elsewhere. As noted above, Malawi launched a fee-free primary education scheme in 1994, and was followed by Uganda in 1997. Other examples include Nigeria, which launched such a scheme in 1976 and again in 1996; Ghana, which made similar moves in 1961 and 1996; Tanzania, which followed suit in 1977 and 2001; Kenya, which did so in 1978 and 2003; and Zambia, which followed in 2004. As noted earlier, this enforcement mechanism appears to

Parents, teachers, and school directors perceive PAP school operational budget and remedial programs positively.

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[64] An impact evaluation of PAP primary education based on data collected as part of the Public Expenditure Tracking Survey is under way, exploiting the variation generated by the phased introduction of PAP, which was also accompanied by changes in school operational budget amounts and variations in the actual PAP package (start-of-year fees were not abolished until 2001).

[65] Although there is no rigorous quantitative evidence on the performance of PAP programs in terms of the ultimate outcomes of interest, two studies look at the assessment of program benefits by their intended beneficiaries: a private cost study by Bray and Seng (2004), and the PAP perception survey (MoEYS, 2002c). These two studies also provide some quantitative and qualitative data on the performance of PAP in terms of intermediate outcomes, that is, outcomes that are necessary but not sufficient for the programs to yield substantial benefits in terms of education outcomes. These include: (i) whether funds flowed smoothly and reached beneficiaries on time; and (ii) whether these funds were put to intended/good use.

have been less effective in the case of LSSs, which reflects their relatively low financial accountability to local communities.

PAP school grants and remedial classes

In both the PAP perception survey (MoEYS, 2002c) and the private costs study (Bray and Seng, 2004), parents, teachers, and school directors reportedly perceive PAP school operational budget and remedial programs positively. However, it is worth noting that while most parents are aware of remedial classes, very few are familiar with school operational budgets and fewer still know how these funds are spent (MoEYS, 2002c). This explains, in part, why parents are more indifferent to school grants than teachers.

The effectiveness of PAP has been impaired by problems of cash flow. This problem was highlighted in the evaluation of the initial pilot in 2000 (MoEYS 2001), and has remained a challenge to date. Table 23 indicates that overall, only 46.6 percent of PAP funds allocated in 2002 was released by June 2003. The figure for PAP 2 was 61.7 percent, while 59.8 percent of PAP 3 funds had been released, and only 32.0 percent of PAP 1 funds had. MoEYS is conscious of the weaknesses in performance, and has taken some bold steps to increase disbursement flows. At the same time, MoEYS recognizes that difficulties have arisen from poor management capacity that cannot be instantly resolved. "Stakeholders," they contend "have to be realistic in their expectations alongside progressive capacity building" (MoEYS 2003a, p.29). When funds arrive, directors and teachers are oftentimes unclear as to whether funds in hand are allocations for the previous year arriving late or allocations for the present year arriving on time.

The effectiveness of PAP has been impaired by problems of cash flow.

Faced by such delays and the need to survive, some schools have reinstated the practice of collecting contributions from parents. MoEYS is aware of this matter, recognizing in 2003, for example, that "PAP disbursement is unreliable and unpredictable which undermines the potential for decentralization and quality improvement," and that "the complicated allocation trail is not transparent enough" (MoEYS 2003a, p.47).

Regarding the use of PAP school grants, teachers in the perception survey (MoEYS, 2002c) stated that most of the budget is used for:

- school maintenance and environment (particularly within LSSs), and
- teaching and learning materials (particularly in primary schools).

Table 23. PAP allocations and releases, 2003 (Million Riels)

	Allocated	*Released*	*% Released*
PAP 1: Education Service Efficiency	10,530	3,371	32.0
PAP 2: Primary Education Quality and Efficiency	23,918	14,760	61.7
PAP 3: Secondary Education Quality and Efficiency	7,386	4,415	59.8
PAP 4: Technical & Vocational Education Quality Efficiency	1,576	940	59.6
PAP 5: Quality and Efficiency of Higher Education	101	51	50.5
PAP 6: Continuous Teacher Development	6,557	3,938	60.1
PAP 7: Sustainable Provision of Core Instructional Materials	13,348	3,207	24.0
PAP 8: Expansion of Non-Formal Education	1,998	808	40.4
PAP 9: Youth HIV/AIDS Awareness }			
PAP 10: Sports Development }	601	179	29.8
PAP 11: Strengthened Monitoring Systems	401	189	47.1
PAP 12: Scholarships and Incentives for Equitable Access	6,730	2,260	33.6
Total	*73,147*	*34,118*	*46.6*

Source: MoEYS (2003b), p.33.

In relation to remedial classes, 77 percent of the expected coverage in terms of students was achieved in 2001. This represented approximately 16 percent of the primary school population. More than 16,000 primary school teachers, roughly 25 percent of the primary teacher service, delivered these classes, received in-service orientation in remedial program delivery, and received over-time payments (MoEYS, 2002b).

In terms of the qualitative aspect of the use of funds, both studies report that personnel in primary and lower secondary schools commented that school operational budgets lacked the flexibility needed to meet local needs. Most teachers do consider the school budget to be somewhat transparent, and have been involved in the preparation of their School Development Plan (SDP). Most parents, however, are neither aware of this process nor involved in it. This gap is attributed to a combination of factors including schools' lack of effort to involve parents and parents' lack of active participation in school matters. Thus, in order to maximize the potential impact of school grants on education outcomes, increased community engagement in the school planning process would be advisable.

Finally, most schools point out a lack of accounting skills at the school level and an inability to deal with the financial procedures and requirements set by MoEYS. This highlights the need to deepen capacity building efforts at the school level.

There is a recognized need for capacity building at the school level.

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4.3. Lessons from an Education Quality Improvement Intervention

This section draws mainly from the impact evaluation study of EQIP conducted by Marshall (2004) (for an overview of Marshall's study, refer to Appendix Q). EQIP school clusters received, on average, slightly less than two dollars per student per year. Funds were used to finance a range of local initiatives developed collaboratively among education stakeholders. Teacher development captured as much as 57 percent (in year 2) of the total spending, and this category was consistently the largest budget item. Teacher development involved hiring trainers to provide classes, providing materials for these training sessions, and providing teachers with cash "incentives" to attend. Pupil learning materials, libraries, and equipment were the other main investment items using EQIP grant funds. For equipment, the overall expenditures declined with time and appear to have been replaced by increases in remedial classes and student health expenditures.

As earlier documented, results from EMIS reveal dramatic increases in student promotion rates and decreasing student dropout rates in all provinces between 1999 and 2002. What is notable is that EQIP had a positive effect *over and above* this general trend. Considering the sample average for dropout was roughly 10 percent for all grades 1-6, the EQIP impact translated into roughly 30-40 students per year per cluster who remain in school that would otherwise have dropped out. The positive changes in promotion rates are on an order of between 1 and 2.5 percent per year.

In addition, EQIP participation (but not the time spent in the program) also predicts higher scores on literacy and numeracy exams. EQIP participation has been associated with a 0.62-point increase in the numeracy test and a 0.88-point increase in the literacy test. Considering that the standard deviation for each test is roughly 3.5 points, these effects are actually fairly large in standardized terms.

Among all the different quality improvement interventions under the program, money invested in teacher development had the highest payoff in terms of student retention, promotion, and especially in student learning. A one dollar per pupil increase in EQIP money devoted to teacher training generally led to between 0.70 and 1.05 points higher on the EQIP exams. A standard deviation increase in this component (about 50 cents per pupil) predicated approximately a 0.15 percent of one standard deviation increase in student literacy. Cost-effectiveness calculations indicate small amounts of money devoted to teacher training can have large impacts on learning: it costs about $1 per pupil to increase test scores by 1 percent. In terms of reducing student dropout, investments in health and vocational training were also important. Investments in equipment and school infrastructure also showed promising effects in improving promotion rates.

Small amounts of money devoted to teacher training can have large impacts on learning.

4.4. Lessons From a Cash School Subsidy

The JFPR/ADB scholarship program targeted 93 LSSs in 21 provinces in 2003/04. Each selected school was awarded 45 scholarships of $45 each for children who have completed primary school and would like to enroll in grade 7 (this includes newly promoted students as well as children who completed primary school some time ago).[66] They were also awarded 30 scholarships for students at risk of dropping out of grade 8.[67] Local Management Committees (LMCs)[68] conducted the selection of beneficiaries from a pool of scholarship applicants after checking the eligibility criteria and scoring each application form according to a means test. Successful candidates were then asked to sign a student/parent contract that specifies the conditionalities attached to the scholarship. Specifically, the contract asks the student/parent to comply with program rules that include the following provisions:

- scholarship students who repeat a grade at the end of the academic year will be disqualified from the program, and
- scholarship students who have more than 10 absences in a given year without an acceptable reason will be disqualified from the program.[69]

Program rules also include the prohibition of fees of any type for scholarship students.

<u>Initial enrollment effect</u>

An ongoing in depth inter-agency study is underway to evaluate the impact of the JFPR/ADB scholarship program and analyze its targeting performance (for a broader discussion on the analysis, refer to Appendix R). The study is based on the computation of the "initial" enrollment effect of the program as the difference over time in the girl-to-boy enrollment level in grades 7 and 8, separately, between schools that received JFPR scholarships and schools that did not. The rationale behind this procedure is the following: if most scholarships were allocated to children who would have enrolled in grade 7 even without the scholarship, a significant change in enrollments would not be observed. A significant change, however, would likely occur if most scholarships were allocated to children who would only attend lower secondary school if funded by a scholarship. In other words, since the project was primarily targeted to girls, one would expect to observe a difference between the growth in

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[66] An additional $45 per student per year is awarded to students from ethnic minority areas who, because of the distance they live from school, need to pay for lodging or transportation to attend school.

[67] The term student refers to girls in the case of the 75 poorest schools and both girls and boys in the case of the 18 schools located in Ethnic Minority Areas.

[68] The LMCs consist of representatives of primary and secondary schools, commune councils, and other community groups.

[69]

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girls' enrollment in treated schools and that of untreated schools before the program began.[70]

The discussion of the results begins with a presentation of the mean enrollment by school broken down by gender, year, and treatment status in Table 24. This data forms the basis for the estimates of program impact.[71] Table 24 indicates that enrollments generally grew over time in all categories. Girls' enrollment is lower than boys' in program and non-program schools in all grades and years.

Table 24. Number of enrolled students, by year, gender and treatment

	2002	2003	2004
Grade 7			
JFPR schools			
Girls	109.1	121.8	135.3
Boys	155.6	171.9	171
Other schools			
Girls	119.4	142.4	152.1
Boys	171.7	188.2	190
Grade 8			
JFPR schools			
Girls	65.9	81.2	91.2
Boys	116.7	128.9	136.1
Other schools			
Girls	82.0	95.1	108.7
Boys	130.7	141.2	147.6

Source: EMIS, several years.

While the magnitude (and significance) of the estimates varies with the methodology used, they all suggest that the scholarship scheme has indeed a modest positive impact on 7th grade girls' enrollment.

The scholarship scheme may have had a modest positive impact on 7th grade girl enrollment.

Targeting

The success of demand-side incentives depends on their ability to encourage the poorest of the poor and those already out of the school system to apply for scholarships. In addition, innovative strategies are needed in order to identify those who would not go to school in the absence of an incentive. Many programs rely on local knowledge of students' home situations to identify potential participants. But such

There is a need to devise appropriate innovative strategies to encourage the poorest of the poor and those already out of the school system to apply for scholarships.

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[70] In other words, we would be considering the time period between the 2001-02 school year and the 2002-03 year.

[71] These preliminary results are taken from a discussion paper written by Filmer and Schady (2004).

approaches may call into question the transparency of the selection process or bias the results in undesirable ways. Adequate means tests, that is, background questionnaires or application forms that identify variables known to be strongly correlated with household poverty or school dropout risk, provide a much needed independent technical framework for decision making.

As the analysis in Chapter 1 has shown, the pool of potentially eligible children for lower secondary scholarships (i.e. those who have completed primary school) is already a highly selective group from the initial population of children starting primary school. If the goal is to expand lower secondary opportunities to all children, the bottleneck in basic education must be addressed starting in upper primary, where both direct and indirect costs of schooling begin increasing rapidly.

Furthermore, as discussed earlier, the differences in school progress by wealth quintile and gender in Cambodia, along with the findings on direct and indirect costs, justify a program targeted to the poor and some calibration of transfers by gender. However, empirical evidence does support a transfer inclusive of poor girls *and* boys. After all, differences in school progress by gender pale in comparison to those by household wealth.

Differences in school progress by gender pale in comparison to those by household wealth.

Program design

As part of the M&E system of the program, there is a fingerprint check on each selected student to ensure that they receive their scholarship installment and to monitor how much they receive. In addition, beneficiaries complete a questionnaire where, for example, they are asked for what purposes the funding was destined. One of the purposes of this type of exercise is to assess features of the program design, such as the ability of scholarship size to induce children to go to school and to identify an optimal amount that triggers the desired outcome.

Conditional cash transfer (CCT) programs aim to foster human capital accumulation among the young as a means to breaking the inter-generational cycle of poverty.

Scholarship and, more generally, conditional cash transfer (CCT) programs are part of a new generation of development programs that seek to foster human capital accumulation among the young as a means to breaking the inter-generational cycle of poverty. Following the success of programs such as PROGRESA in Mexico, this type of intervention has been introduced in many countries.[72] In the East Asia region, a scholarship program was introduced in Indonesia in 1998 as a result of the Asian economic crisis. Evidence so far suggests that these demand-side schemes are an effective means of improving education outcomes and reducing current poverty. There are still uncertainties about the efficiency of these types of programs (Sadoulet and de Janvry, 2004), and whether they alone are effective at reducing the incidence of child labor (Duryea and Morrison, 2004).

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[72] See Rawlings and Rubio (2003) for a review of these programs, and an evaluation of their impact, in Latin America and the Caribbean.

Programs vary in design and effectiveness in one country does not guarantee effectiveness in another. Still, there are important lessons that may be drawn from this type of program in the context of Cambodia. In addition, finding the program design that works best for Cambodia requires some experimentation. Possible variations may include:

- comparing the results of a program focusing only on LSS, to a scheme that provides benefits in upper primary, with continuity into LSS;
- comparing alternative targeting mechanisms at the individual level (e.g. a selection based on centrally-determined means tests versus a selection based entirely on the subjective assessment of LMCs); and
- different benefit amounts, with the objective of identifying the minimum amount that induces a child to enroll or remain in school.

Finally, models elsewhere show that school subsidies do not necessarily have to be in cash. In Bangladesh, for example, targeted children have been given flour and rice rather than cash, which has proven effective in increasing enrollment and reducing child labor (Ravallion and Wodon, 2000). One such program, the School Feeding Program, has been implemented in selected primary schools in Cambodia.

Models elsewhere show that school subsidies do not necessarily have to be in cash.

4.5. Stakeholder Views on Appropriate Education Interventions

This section provides a qualitative analysis of stakeholders' views on interventions to increase school participation. It complements the previous quantitative investigation of the merits of alternative education interventions. The analysis is based on focus group discussions with teachers, parents, and children from a small sample of primary and lower secondary schools in Cambodia (Bredenberg, 2003).

Among student respondents presently in secondary school whose continued enrollment is tenuous, there is a very strong preference for cash incentives. Forty-eight percent of the students responding to a question about appropriate interventions to help them stay in school chose the option of a cash incentive of CR 180,000 ($45) or more. The student preference for cash incentives was consistently strong across most demographic groupings with the exception of rural students whose preference was evenly spread across each proposed option. Urban students in particular chose this option in large numbers, likely in reaction to the high tutoring costs in the city. In considering the survey results, it is important to note that these are responses of students who have already enrolled in high school, the majority of whom may have been able to enroll because distance concerns were not a major issue. This, no doubt, partially accounts for the lower preference for supply-side interventions.

Among other stakeholders, there was also a strong endorsement of demand-side interventions such as scholarships. Teachers suggested that subsidies for students, coupled with the expansion of infrastructure/facilities, be employed as a front-line strategy. On the other

hand, parent groups, especially those in urban areas, tended to advocate the reverse strategy. This seems to contradict what some parent groups had indicated in relation to the primacy of direct and indirect costs as a factor that leads to student dropout.

Parents in remote schools, however, advocated subsidies over infrastructure, focusing on the costs of education. This aligns with student survey results in which remote students cite direct educational costs as their most significant problem (54 percent). When queried further about why distance and paucity of infrastructure were not their primary concerns, many parents seemed to feel that subsidies could help buy bicycles to address this issue. In addition, they pointed out that secondary school infrastructure in their communities was often underutilized and that government had not been able to adequately staff schools that had already been provided. Thus, parents living in remote areas tended to view the provision of bicycles as an intervention that helps to address both financial considerations and distance/infrastructure concerns. Among urban parents, however, most felt that bicycles were largely impractical due to traffic concerns.

As a group, teachers overwhelmingly endorsed scholarships as the most important intervention that the Government could support to increase participation rates at both primary and secondary school levels. They further added that scholarships should be provided as assistance *in kind* rather than as cash payments, citing high risks that such payments would not be directed towards educational costs. Teachers also pointed out the extremely high costs of secondary education at grade 9 when students must study for the national exam, causing direct costs to mushroom to over CR 1,000,000 per year ($250). These high costs are mainly associated with tutoring charges and opportunity costs.

CONCLUSION: The Ongoing Program for Educational Reform

In recent years, Cambodia has experienced a significant increase in public resources devoted to education, particularly recurrent expenditures in the basic education sector. This change reflects the realization by the RGC that any effort to improve the education base of the country must first address the fundamental concern of providing quality basic education for all. The change is also in line with the Government's priority strategy to reduce the cost burden on the poorest families in order to foster increased basic education participation amongst the children of these families. This major shift in the education sector strategy has been operationalized through a series of Priority Action Programs, which have extended their coverage to include other aspects of the basic education sector, such as quality and efficiency, and other priority sectors.

The recently approved ESP for 2004-08 (MOEYS, 2004a) delineates a set of policy priorities that diverges from previous policy frameworks for basic education in three main respects:

- increased emphasis on demand-side interventions;
- increased attention to improving education quality; and
- increased focus on lower secondary education.

These policies include:

- **Demand-side interventions** to reduce cost barriers now limiting basic education access:
  - the abolition of all informal/illegal payments in grades 1-9, and
  - the provision of scholarships for the more impoverished in grades 7–9.

- **Supply-side interventions** to increase the quantity and quality of school inputs and improve processes in basic education:
  - phasing out of incomplete primary schools;
  - expansion of lower secondary school facilities;
  - provision of school operating budgets (linked to the abolition of informal/illegal fees);
  - development of remedial classes;
  - improvement of school readiness;
  - increased provision of core instructional materials;
  - increased deployment of new Teacher Training College (TTC) graduates to under-served areas and increased recruitment of TTC intake from these areas;
  - an across-the-board increase in teacher salaries;

- o reinforcement of performance-based incentives, along with the introduction of a performance appraisal system and teacher professional standards;
- o increased provision of in-service training; and
- o introduction of a student and school-based assessment system.

The balance between these various policy priorities is reflected in the recently drafted ESSP 2004-08 (MOEYS, 2004c), which also outlines how these policies will be implemented in practice (Table 25). This is an ambitious reform agenda that has already begun to bear fruit. The transformation of the basic education system in Cambodia in the past decade has been notable.

But some important challenges remain. Moving into the future, MoEYS will need to begin to devote greater attention to the following three broad areas of action in order to fulfill its goal of universal quality basic education for all.

First, while it is important to provide increasing resources to LSS, this report finds that the bottleneck of the basic education system begins, not in LSS, but in upper primary school. Despite recent progress, Cambodia still has some way to go before achieving universal primary education. The report also finds that direct and indirect household costs reinforce each other to produce a critical barrier for the poor starting in upper primary. These findings warn against loosing sight of the primary school sector, and thus call for greater emphasis on this sector, particularly its demand side.

In addition to interventions that are mainly designed to keep children enrolled in basic education, efforts are needed to recover some of those who are already out of the system. To this end, the government is to be commended for the expansion of re-entry and equivalency programs for school dropouts.

Second, this report finds that late school entry is a pervasive and structural phenomenon with very negative consequences on primary school completion. Late school entry is associated with schooling facing greater competition from work responsibilities. Thus, combating late school entry should be a stated policy objective in itself. In this sense, policies that attract children to school at the official entry age of 6 will be key to reducing primary school dropout.

The report also suggests that in order to achieve this, and to reduce dropout rates more generally, efforts are needed to attend to the school readiness of children and the provision of preschool education. Early childhood education (ECE) is indeed an element of the ESP and ESSP. However, investments in ECE (USD 125,000 in 2004, increasing up to USD 250,000 in 2008) are comparatively very modest within the overall education program, particularly given the magnitude of the problems they aim to address. Furthermore, the main ECE intervention within the ESSP is narrowly limited to an 8-week school readiness program for 5-year old children who are unable to attend preschool or access community-based

Table 25. Capital and recurrent budget program priorities for 2004-08 (basic education, million CR)

	2004	2005	2006	2007	2008
Education facilities development (2004-08)					120,000
Incomplete primary schools					20,000
LSS					100,000
Education Service efficiency and performance	**14,461**	**16,670**	**17,090**	**17,490**	**19,245**
Management and technical support	1,500	150	1,500	1,500	1,500
Teacher redeployment	1,500	1,300	1,000	1,000	1,000
Performance-based incentives	10,800	13,200	13,900	14,300	16,000
Orientation and monitoring material	661	670	690	690	745
Early childhood education	**500**	**630**	**755**	**845**	**1,000**
Preparation course	450	480	500	530	550
Community-based ECE	45	145	250	310	445
Monitoring	5	5	5	5	5
Primary education quality and efficiency	**34,600**	**38,590**	**40,010**	**40,975**	**45,105**
School operational budgets	31,000	32,000	33,500	34,000	38,500
Remedial classes	2,000	4,500	4,500	4,500	4,500
Monitoring	2,100	2,090	2,010	2,475	2,105
Lower secondary education quality and efficiency	**7,500**	**14,175**	**16,350**	**19,870**	**25,065**
School operational budgets	6,900	11,450	13,550	17,000	22,100
Remedial classes	--	2,000	2,000	2,000	2,000
Monitoring	600	725	800	870	965
Teacher development	**9,713**	**10,320**	**10,770**	**10,845**	**11,750**
Operational budget for TTC and NIE	4,200	5,200	5,650	5,700	6,200
TTC staff development program	300	300	300	300	300
Education management development	2,000	2,200	2,200	2,200	2,500
Continuous teacher development	2,600	2,300	2,300	2,325	2,430
Monitoring and evaluation	313	320	320	320	320
Provision of core instructional materials	**13,000**	**13,510**	**13,820**	**13,650**	**14,535**
Primary schools	8,770	7,980	7,780	7,550	7,700
Secondary schools	4,230	5,530	6,040	6,100	6,835
Re-entry and equivalency programs	**3,080**	**4,500**	**5,000**	**5,140**	**5,800**
Lower secondary scholarships for the poor	**2,520**	**2,520**	**3,650**	**5,000**	**6,785**

Source: ESSP 2004-08. The figures for lower secondary scholarships for the poor does not include funding from JFPR, BETT and CESP

ECE. A more comprehensive framework may provide effective alternative avenues and insights to address the pervasive late entry phenomenon.

Third, the analysis of direct costs demonstrates that these remain a significant barrier to participation in schooling for disadvantaged children. The removal of formal entry fees brought about a significant improvement with visible pay offs. But uprooting informal fees, such as those from supplementary tutoring, will require more comprehensive strategies as they are linked to broader civil service reform constraints. The ESSP has begun to address the low level of teacher pay by incorporating incentives for hardship posts and remedial teaching. But these incipient steps must be articulated more clearly into a deeper teacher remuneration overhaul inclusive of teaching service conditions, minimum standards, and performance-based incentives within a sustainable budget framework.

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APPENDIX A

EMIS figures are constructed using the reconstructed cohort method. This method relies on the dropout and repetition rates of Table 5 for the school year 2001-02. These rates are in turn estimated using new enrollment and repetition data in 2001-02 and 2002-03. The estimates assume that there is no school reentry and no school transfers between these two years.

The underlying assumption is that children drop out of school after repeating more than one grade in a given school level. CCLS figures are estimated using the information on actual grades attended and completed by children aged 6-17 (15-17 in the case of overall completion rates) and their current enrollment status. These age groups are chosen to facilitate credible estimates that are as representative of the current situation as possible, while ensuring that everyone in this sample has had the chance to enter school (in the case of the 15-17 age group).[73]

Although survival and completion rates are subject to measurement error in both cases, CCLS figures are superior as they are based on actual grades attended and completed, rather than being constructed for a synthetic cohort under specific assumptions about grade repetition. The picture of school progress that emerges from CCLS data for 2001 is unlikely to have improved much since then, given that dropout rates have remained largely unchanged according to EMIS.

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[73] In contrast with the enrollment figures, transition (and completion) rates are 'constructed' differently in EMIS and CCLS and the measures are not necessarily contemporaneous.

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Multivariate Framework

Each education outcome is modeled separately as a linear function of education 'inputs' and is estimated by Ordinary Least Squares (OLS). The education outcomes considered in the analysis include:

- student flows (including dropout, repetition, and promotion rates), and
- age-by-grade distortion measures (including overage enrollment and overage intake).

Because there is no data pertaining to student learning available at the national level, it is not possible to explore the quality dimension of education.

Education inputs are broadly defined as school and teacher characteristics, and proxies for the socio-economic, health, and education environment of the school. The proxies are measured by commune-level indicators of poverty and inequality, prevalence of stunting among children 0-5 years old, and the presence of lower secondary schools respectively. While the quantity and quality of school inputs capture the supply side of the education outcome production, the latter environmental variables are intended to capture more of the demand side.

In addition, the models include proxies for technical and economic efficiency in the production of education outcomes using school resources. Specifically, the efficiency with which school inputs translate into education outcomes depends on variables such as the skills of school directors (proxied here by their experience and education levels) and the incentive of teachers to provide quality teaching (proxied here by the distribution of teacher salary in the schools). Likewise, the extent to which the school itself may choose inputs (school autonomy) and the degree of community and parental participation in school operations, as well as their interaction, influence the choice of inputs and potentially lead to 'higher' education outcomes for a given level of school resources. As proxies for parental and community participation, the model below includes an indicator for whether the school has an active parental association as well as an indicator for whether the school receives funding from the community. A suitable proxy for school autonomy was not identified in the EMIS dataset.

While the unit of analysis for age-by-grade distortion measures is the individual school, the models for student flows are grade-specific, that is, they look at flows in every grade offered by the school. This approach is more efficient than looking at summary statistics for student flows at the school level (e.g. overall dropout rate in the school), as it utilizes more information. Furthermore, contrary to the school-level education outcome measures, modeling grade-specific measures allows us to avoid the bias arising from the fact that incomplete schools have fewer grades so children

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in these schools are less exposed to the risk of dropping out or repeating than children in complete schools.[74] Finally, this approach also allows us to examine the impact of offering less than the full range of primary school grades on education outcomes over and above the loss associated with the grades that are not offered. This model includes both school-level and grade-specific inputs. Models with age-specific student outcomes also allow for grade-specific effects by including separate intercepts for each grade.[75] The construction of grade-specific student flows follows standard procedures and uses new enrollment and repetition data in two consecutive school years.[76]

The final model was the result of a careful search for the most comprehensive yet parsimonious specification. All the variables included in the model can be linked to education policies − although variation in these 'inputs' cannot be tied to a specific policy or program in Cambodia in all cases.[77] Moreover, the ability to make causal inferences from model estimates may be limited in the absence of pure exogenous (to education outcomes) variation in education 'inputs.'[78] In addition, EMIS and WFP variables are likely to be measured with error.[79] As shown earlier, in terms of the level of the education outcomes of interest, there are differences between EMIS data and the more reliable household survey data. Errors in the measurement of education outcomes could arise from:

> (i) the construction of promotion and dropout rates in the absence of data on school re-entry and school transfers;

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[74] Incomplete schools contribute to the estimation sample up to the last grade offered, inclusive (in the case of repetition rates) and non-inclusive (in the case of dropout and promotion rates).

[75] In addition, these models correct the OLS standard errors of the coefficient estimates (and thus their precision) for a generic form of correlation between observations within schools (i.e. grades within schools).

[76] The promotion rate for the grade six is calculated somewhat differently: it uses the information on previous years' enrollment in grade 6 and end of the same year's number of graduates. It is worth noting that estimates for student flows do not take into account students that may have re-entered the formal school system or those who may have transferred in (out) from (to) another school, which are not documented in EMIS. It would be particularly important to document the 're-enters' in order to better evaluate the impact of the education reform, in general, and the impact of equivalence programs, in particular.

[77] As mentioned in the introduction, however, the last chapter of the study tries to shed light on the relationship between specific education policies and education outcomes by looking at Cambodia's experiences with past and ongoing demand-side and supply-side interventions.

[78] In particular, to the extent that there are school-specific characteristics that are not measured in the dataset and are correlated with school characteristics that are both measured and included in the model, the model would yield biased estimates of the structural effect of education inputs on student outcomes.

[79] In the case of EMIS, a questionnaire is sent out to every school to be filled out and returned by the school director. There are some inconsistencies in trying to track schools over time, which limit the ability to conduct a longitudinal analysis. The EMIS database for 2002-03, however, was the first one where data inconsistencies were actually checked with schools themselves. In the case of WFP, the actual figures for poverty, inequality, and stunting are estimated with some degree of imprecision by combining census 1998 and survey data -SES 1997 for poverty and inequality and DHS 2000 for stunting (WFP, 2002, 2003).

(ii) the construction of grade-for-age distortion indicators when age is misreported; and

(iii) conscious misreporting of enrollment or repetition number by schools.[80]

While (i) and (ii) are not likely to bias model estimates, (iii) could if schools differ in the degree to which they consciously misreport in systematic ways. However, if that were the case, one would not expect to find any systematic relationship between education outcomes and school characteristics, which, as shown below, is in fact found. Of course, school characteristics and environmental variables can also be measured with error, and that could potentially bias the exact point estimates of the model. Despite the potential problems with omitted variables and errors in variables, the analysis in Chapter 2 is still likely to provide an informative general characterization of the relationship between education outcomes and inputs.

All models are estimated for both primary and lower secondary schools (this includes the lower secondary portion of schools that offer the full range of secondary school grades). Within each school level, the models are also estimated separately for boys and girls, as well as by geographical location of the school, and the differences between the various groups are examined. Appendices C and D define all the explanatory variables used in the analysis and report their means and standard deviations by school level.[81]

The analysis focuses on the results from the models for dropout and overage intake. First, the primary interest is in understanding the factors that attract and retain children in school. Examining the factors that attract children of the right age to the school system is particularly relevant given the pervasive nature of overage intake in grade 1 and, as it is shown, the negative consequences of late entry on subsequent dropout. Second, promotion standards are not homogeneous but vary across schools (even across teachers within the same school) with 'better' schools possibly applying stricter standards, but otherwise varying in ways that are unrelated to the measured school and environmental variables in the model. Still, grade repetition, particularly in primary school, is rampant in Cambodia. Examining the determinants is interesting in itself due to its potential association with dropout and, of less importance, its tendency to generate inefficiency in the system. Third, as was seen earlier, overall overage enrollment is largely the result of overage intake but is also determined by repetition. Finally, the discussion and associated tables are focused on the results for all children and for the whole sample of schools in a given level.

The estimation results are presented in Tables 11-12 for primary schools. Table 13 and the below table present the results for lower secondary schools. The coefficient estimate associated with each explanatory variable

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[80] For instance, the existence of a governmental program (such as PAP) could lead some primary schools to report inflated enrollment figures since their funding allocation is provided on a per-pupil basis.

[81] For summary statistics of student outcomes see tables in the previous sections.

measures the relationship between this variable and the education outcome, controlling for other variables. Thus, it indicates the association between a change in the variable of interest and the student outcome holding the other variables constant.

Models for age-for-grade distortion measures, LSS schools

	Overage grade 7 intake		Overage enrollment	
	Coeff.	t-ratio	Coeff.	t-ratio
Intercept	85.49	12.7	43.57	4.89
Urban area	0.97	0.5	3.85	1.7
Poverty	-0.04	-0.9	-0.00	-0.0
Upper secondary grades offered	-0.18	-0.1	-0.07	-0.0
Parental association (PA)	-3.80	-1.7	-4.47	-1.7
Number of meetings of PA last year	0.71	2.1	1.24	3.0
Director: female	-0.70	-0.2	-4.65	-1.2
Director: Years of service	-0.01	-0.1	0.04	0.4
Director: USS completed	-0.76	-0.4	1.16	0.6
Director: college completed	-3.73	-1.4	-3.32	-1.3
Classrooms: physical conditions	0.30	0.6	-0.11	-0.2
Classrooms: furniture conditions	-0.02	-0.1	-0.27	-0.4
School facilities: drinking water	-2.51	-1.6	-2.86	-1.6
School facilities: latrines	2.14	1.1	3.30	1.4
School facilities: library	-0.62	-0.4	-2.05	-1.1
School facilities: librarian	1.77	0.9	4.75	2.0
Teachers: % female	-0.16	-2.6	-0.03	-0.5
Teachers: % with 5-15 years of exp.	-0.10	-1.9	-0.05	-0.8
Teachers: % with >15 years of exp.	-0.08	-1.5	-0.13	-1.8
Teachers: % with USS completed	0.01	0.2	-0.03	-0.7
Teachers: % with college completed	-0.09	-0.9	-0.08	-0.9
Teachers: % in salary a or b Vs c or d	0.03	1.1	0.07	2.0
Teacher guides: availability	-0.05	-0.0	1.56	0.5
Teaching shifts: single Vs multiple	4.03	2.6	2.95	1.7
Pupil-class ratio	0.13	1.3	0.10	0.8
Sample size	575		575	
R^2	9.18		6.66	

Definition, means and standard deviations of variables: primary schools

	Mean	Std. Dev.
Remote area (reference category)	0.07	0.26
Rural area	0.82	0.38
Urban area	0.11	0.31
Poverty: % of households under the poverty line. Source: WFP	42.38	20.85
Inequality: Gini index (between 0 and 100). Source: WFP	30.25	6.54
Stunting: prevalence of stunting among 0-5 children. Source: WFP	48.30	6.31
LSS in the commune	0.39	0.49
Pre-school attached	0.17	0.37
Average overage grade 1 intake in the past (since 1999)	41.00	28.16
Highest grade offered in the school	4.89	1.56
Parental association (PA)	0.83	0.38
Number of meetings of PA last year	3.16	3.17
Whether the school receives community donations	0.07	0.26
Director: female	0.06	0.24
Director: Years of service	9.59	6.56
Director: Whether director has less than LSS completed (reference)	0.15	0.35
Director: Whether director has LSS completed	0.78	0.42
Director: Whether director has USS or higher completed	0.08	0.27
Classrooms: index of physical conditions (floor, roof and wall)	0.00	1.50
Classrooms: index of furniture conditions (desk, chair, board, tables)	0.00	1.73
School facilities: Whether school has drinking water	0.41	0.49
School facilities: Whether school has latrine facilities	0.48	0.50
School facilities: Whether school has a library	0.22	0.41
School facilities: Whether school has a librarian	0.25	0.43
Teachers: % of female teachers	28.68	27.55
Teachers: % of teachers with < 5 years of experience (reference)	28.23	30.24
Teachers: % of teachers with 5-15 years of experience	30.01	27.89
Teachers: % of teachers with >15 years of experience	40.92	31.25
Teachers: % of teachers with pedagogic training	94.62	17.93
Teachers: % of teachers with less than LSS completed (reference)	13.51	13.64
Teachers: % of teachers with LSS completed	67.42	33.64
Teachers: % with USS or more completed	19.07	24.94
Teachers: % in salary scale a, b or c versus d	85.90	27.75
Teacher guides: availability for the core 4 subjects (grade-specific)	0.87	0.33
Teaching shifts: single Vs multiple	0.21	0.41
Pupil-class ratio	44.75	10.11

Notes: Statistics are defined at the school level. The availability of teacher guides and the pupil-class ratio are defined for each grade in the models for student flows but summarized here at the school level. Variables indicating percentages are measured in a 0 to 100 scale. Reference categories are those excluded from the actual model and to which the coefficient estimates of the other categories related to the same characteristic are expressed relative to.

Definition, means and standard deviations of variables: LSS schools

	Mean	Std. Dev.
Dropout rate		
Overall	21.69	14.37
Between school		9.95
Within schools across grades		10.56
Repetition rates		
Overall	6.27	9.44
Between schools		4.83
Within schools across grades		8.13
Promotion rates		
Overall	72.10	18.24
Between schools		10.21
Within schools across grades		15.34
Overage grade 7 intake	81.85	16.67
Overage enrollment	49.09	19.28
Urban area Vs rural or remote	0.17	0.38
Poverty: % of households under the poverty line. Source: WFP	37.36	18.93
School offers upper secondary grades	0.30	0.46
Average overage grade 7 intake in the past (since 1999)	0.21	0.16
Parental association (PA)	0.82	0.39
Number of meetings of PA last year	2.72	2.42
Director: female	0.05	0.22
Director: Years of service	9.94	6.93
Director: Whether director has less than USS completed (reference)	0.58	0.49
Director: Whether director has USS completed	0.26	0.49
Director: Whether director has college completed	0.16	0.37
Classrooms: index of physical conditions (floor, roof and wall)	0.00	1.45
Classrooms: index of furniture conditions (desk, chair, board, tables)	0.00	1.69
School facilities: Whether school has drinking water	0.58	0.49
School facilities: Whether school has latrine facilities	0.71	0.45
School facilities: Whether school has a library	0.58	0.49
School facilities: Whether school has a librarian	0.71	0.45
Teachers: % of female teachers	27.32	17.50
Teachers: % of teachers with < 5 years of experience (reference)	29.50	22.77
Teachers: % of teachers with 5-15 years of experience	46.83	20.00
Teachers: % of teachers with >15 years of experience	23.66	16.18
Teachers: % of teachers with less than USS completed (reference)	51.29	25.96
Teachers: % of teachers with USS completed	47.86	25.94
Teachers: % with college completed8.10	8.10	13.93
Teachers: % in salary scale a or b Vs c or d	43.37	29.52
Teacher guides: availability for the core 4 subjects (grade-specific)	0.84	0.37
Teaching shifts: single Vs multiple	0.56	0.50
Pupil-class ratio	46.60	6.65

Notes: Statistics are defined at the school level. The availability of teacher guides and the pupil-class ratio are defined for each grade in the models for student flows but summarized here at the school level. Variables indicating percentages are measured in a 0 to 100 scale. Reference categories are those excluded from the actual model and to which the coefficient estimates of the other categories related to the same characteristic are expressed relative to.

APPENDIX E

Specifically, the model presented in Chapter 3 takes into account the interrelated nature of school and work decisions by estimating jointly the determinants of current school and work participation of children aged 6-17. Based on these estimates, the degree of substitution between different work activities and schooling is then examined by looking at how these determinants covary with child work and schooling. Further refinements to this basic set-up are then provided by examining the relationship between work and the two variables of school non-participation – dropping out and never having attended school.

Work involvement before school entry, and the extent and timing of school entry are also examined. The analysis is limited by the lack of information pertaining to the school entry age of those who had dropped out prior to the survey. This is, however, the only instance where the timing of schooling and work can be identified and matched to each other, allowing for a more structural analysis of the impact of work on schooling. This analysis also provides valuable information on other structural determinants of school entry age, thus complementing the results on grade 1 overage intake based on EMIS data.

APPENDIX F

As mentioned earlier, work may affect schooling by increasing school dropout or delaying or preventing school entry. To affect school entry, work must have begun before the school entry age considered. For that reason, a child is considered to have worked before school entry if:

- he or she was already working a year prior to the age at which he or she entered school (if he or she entered school),
- his or her current age (if currently not in school and aged 14 or younger),
- 14 years of age (if currently not in school and older than 14 years of age).[82]

The underlying assumption is that a child is no longer at risk of entering school after age 14.[83]

While there is data pertaining to the extent of work performed, there is a lack of information dealing with the time-intensity of work. As noted earlier, the sample used to compute the statistic on work before school entry does not include school dropouts, since there is no information on school entry age for these children. To the extent that late school entry contributes to dropout and that dropout is related to work opportunities, the degree of work before school entry and its negative impact on school entry age would be underestimated. Having said that, the proportion of children who started working before school entry is far from negligible, particularly in domestic work, and thus work may help to explain both late school entry and school dropout itself.

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[82] For example, a child that entered school at age 8 is considered to have worked before school entry if he or she was working by age 7. A 12 year old who has never attended school is considered to be working before school entry if he or she was working by age 11. Finally, a 16 year old who has never attended school is considered to have worked before school entry if he or she was working by age 13.

[83] We do in fact observe very few cases of children entering school after age 14.

Means of model covariates by main school-work category and age group, boys

	6 to 11s				12 to 14				15-17			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Child's age	7.16	8.08	9.46	8.65	12.91	13.14	13.02	12.88	15.95	16.22	15.81	15.85
Child is offspring of hh head	93.99	94.06	96.26	91.00	80.22	90.64	95.26	94.88	94.94	91.52	93.69	91.86
Mother's years of schooling	1.66	2.17	2.75	3.00	0.78	0.97	2.48	2.81	1.77	1.78	2.45	3.10
Father's years of schooling	3.12	3.52	4.31	4.58	2.85	2.47	4.01	7.41	3.97	3.39	4.41	5.02
# of 0-5 children in hh	0.82	0.76	0.80	0.68	0.56	0.62	0.51	0.47	0.43	0.47	0.41	0.34
# of 6-14 males in hh	0.93	0.70	0.71	0.81	0.96	0.81	0.81	0.77	0.98	0.94	0.83	0.88
# of 6-14 females in hh	0.84	0.67	0.75	0.75	0.68	0.90	0.75	0.68	0.90	0.90	0.82	0.80
# of 15-17 males in hh	0.25	0.17	0.24	0.28	0.39	0.30	0.30	0.39	0.18	0.16	0.18	0.18
# of 15-17 females in hh	0.20	0.12	0.21	0.24	0.21	0.26	0.32	0.36	0.21	0.18	0.14	0.17
# of 18-59 males in hh	1.18	1.12	1.26	1.28	1.21	1.11	1.31	1.47	1.20	1.32	1.45	1.60
# of 18-59 females in hh	1.29	1.23	1.36	1.40	1.49	1.38	1.55	1.53	1.55	1.47	1.62	1.69
# of 60+ individuals in hh	0.13	0.13	0.14	0.18	0.21	0.19	0.18	0.90	0.20	0.20	0.22	0.24
Female household head	9.92	15.64	9.99	12.27	22.61	25.86	15.05	13.26	19.45	16.64	14.25	11.00
Khmer	93.84	95.49	98.38	96.84	97.82	89.11	98.15	95.04	97.49	95.71	97.35	96.61
HH in poorest wealth quintile (ref.)	26.70	25.34	20.21	17.11	34.99	34.47	19.43	15.32	28.07	24.62	15.11	6.51
HH in 2nd wealth quintile	29.52	29.83	19.30	15.89	29.58	25.61	17.89	16.14	22.44	21.90	16.13	11.96
HH in 3rd wealth quintile	22.06	22.48	22.26	20.10	17.87	20.08	20.70	18.13	10.21	22.39	20.48	19.43
HH in 4th wealth quintile	11.33	19.12	24.21	21.55	11.65	13.08	24.91	18.31	17.31	19.20	24.50	24.49
HH in richest wealth quintile	10.39	3.23	14.02	25.36	5.91	6.75	17.06	32.10	21.98	11.88	23.78	37.62
HH main activity: farm business (ref.)	63.09	70.58	64.73	51.73	52.86	61.46	65.67	44.27	48.68	63.92	63.83	39.15
HH main activity: non-farm business	22.94	21.12	23.85	30.81	25.83	24.03	22.54	34.75	34.15	23.43	26.75	38.73
HH main activity: casual employment	8.31	6.32	4.06	4.52	17.77	8.52	3.14	5.06	12.01	6.78	1.45	3.12
HH main activity: regular employment	4.38	1.88	6.19	10.82	2.37	5.20	6.70	13.39	4.19	4.34	5.87	15.20
HH main activity: rents	1.28	0.11	1.17	2.13	1.18	0.78	1.94	2.52	0.97	1.52	2.10	3.80
Urban	14.65	11.79	13.45	23.65	15.25	12.28	15.47	27.76	21.47	15.96	18.99	35.39
Commune poverty rate (%)	41.58	42.44	39.70	36.13	41.41	42.80	40.68	34.06	38.69	38.92	40.19	31.65
LSS in the commune	35.45	42.37	50.79	48.08	16.50	37.71	52.53	42.69	45.25	42.77	50.74	40.30
Prim. schools per 1,000 population	0.54	0.57	0.47	0.46	61.73	54.27	46.93	45.16	44.83	50.48	45.27	41.69
% of incomplete prim. schools	41.34	37.93	27.56	30.44	37.65	40.49	28.75	32.54	32.75	37.62	26.74	26.17
% of prim. Schools with PA	73.27	65.66	72.15	78.68	76.50	71.04	74.81	77.78	83.37	71.82	75.59	79.58
% of prim. Schools with preschool	13.70	19.93	22.17	19.62	10.89	17.41	21.65	17.95	20.30	18.30	20.55	19.97
% of prim. Schools with teacher guides	84.80	84.55	88.16	87.66	85.10	84.73	88.95	88.46	93.95	84.57	87.50	91.34
% of female teachers	30.25	29.26	34.35	39.35	26.51	29.45	33.95	39.75	36.47	33.16	36.84	44.55
% of teachers with prim. school (ref.)	13.55	18.91	8.33	6.76	13.61	16.57	8.34	7.39	6.74	9.78	7.87	3.68
% of teachers with LSS	72.61	68.36	77.36	76.18	71.68	68.66	77.11	75.40	75.70	73.60	76.62	77.21
% of teachers with USS or higher	13.83	12.73	14.31	17.07	14.71	14.78	14.55	17.21	17.55	16.62	15.50	19.11

Notes: Categories (1), (2), (3) and (4) refer to idle, work only, school and work and school only, respectively. Ref. refers to reference category.

Means of model covariates by main school-work category and age group, girls

	6 to 11s				12 to 14				15-17			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Child's age	7.19	8.30	9.52	8.64	13.09	13.28	12.91	12.75	16.10	16.16	15.81	15.69
Child is offspring of hh head	93.14	94.23	94.03	92.92	87.02	93.04	96.00	94.32	92.32	88.96	94.38	93.27
Mother's years of schooling	1.83	1.44	2.62	2.94	1.55	1.44	2.52	2.85	2.05	1.98	2.99	4.05
Father's years of schooling	3.09	3.16	4.39	4.64	2.27	2.89	4.03	4.55	2.80	3.61	4.79	5.49
# of 0-5 children in hh	0.92	0.86	0.70	0.69	0.82	0.60	0.49	0.45	0.41	0.46	0.33	0.34
# of 6-14 males in hh	0.87	0.89	0.74	0.79	0.90	0.89	0.74	0.76	0.99	0.87	0.82	0.85
# of 6-14 females in hh	0.79	0.78	0.73	0.76	0.78	0.77	0.90	0.67	0.75	0.89	0.78	0.68
# of 15-17 males in hh	0.24	0.18	0.22	0.27	0.37	0.32	0.33	0.37	0.21	0.16	0.18	0.22
# of 15-17 females in hh	0.22	0.21	0.20	0.24	0.28	0.25	0.29	0.34	0.11	0.14	0.14	0.18
# of 18-59 males in hh	1.18	1.19	1.22	1.26	1.24	1.07	1.39	1.44	1.28	1.35	1.56	1.56
# of 18-59 females in hh	1.30	1.30	1.38	1.37	1.47	1.33	1.51	1.51	1.80	1.48	1.65	1.66
# of 60+ persons in hh	0.15	0.09	0.16	0.16	0.15	0.16	0.19	0.14	0.33	0.19	0.28	0.22
Female HH	12.34	9.57	14.14	11.73	15.60	25.30	12.36	11.42	14.37	21.33	13.79	12.76
Khmer	90.76	94.77	98.37	96.87	94.22	92.56	97.67	95.81	96.11	95.18	97.44	95.91
HH in poorest wealth quintile	28.42	24.53	20.87	16.89	31.98	22.15	18.58	15.37	23.48	20.92	14.71	15.82
HH in 2nd wealth quintile	29.28	30.80	20.42	20.62	31.83	33.63	17.90	16.67	28.63	22.61	12.86	10.52
HH in 3rd wealth quintile	19.82	21.25	20.92	17.49	18.20	19.34	22.88	18.22	15.04	18.20	16.56	12.10
HH in 4th wealth quintile	15.08	18.41	23.61	20.34	12.34	15.03	21.34	20.70	17.19	22.45	24.38	15.01
HH in richest wealth quintile	7.39	5.01	14.18	24.67	5.66	9.85	19.30	29.03	15.66	15.82	31.48	46.55
HH main activity: farm business	62.15	77.00	63.41	51.12	52.50	61.51	66.17	50.82	35.13	59.45	54.68	40.65
HH main activity: non-farm business	21.41	13.42	25.80	32.01	27.66	23.19	21.30	31.38	41.54	24.56	30.79	38.75
HH main activity: casual employment	8.84	3.21	3.93	4.78	17.65	9.94	25.84	4.64	11.89	4.85	1.83	2.68

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
HH main activity: reg. employment	6.80	3.42	5.76	9.62	1.65	4.15	7.85	10.81	5.80	9.46	8.97	15.08
HH main activity: rents	0.80	2.94	1.10	2.47	0.54	1.21	2.10	2.35	5.64	1.68	3.71	2.84
Urban	14.30	11.66	14.70	22.99	13.52	13.78	17.25	26.07	21.37	18.71	25.21	38.00
Commune poverty rate (%)	41.40	44.55	41.74	36.57	48.13	42.93	38.90	36.08	41.80	39.69	35.52	31.97
LSS in the commune	36.55	40.66	51.68	47.36	21.99	33.90	48.24	45.52	35.45	39.85	51.50	44.05
Prim. schools per 1,000 population	51.75	59.25	47.95	47.00	50.35	55.69	47.38	46.63	54.18	47.43	44.55	43.94
% of incomplete prim. schools	41.71	41.80	27.23	31.15	41.08	45.70	28.80	31.62	38.94	33.60	25.72	26.42
% of prim. schools with PA	70.70	64.88	70.83	77.88	64.91	68.12	74.12	80.32	78.15	74.32	72.93	81.65
% of prim. schools with preschool	15.61	16.31	24.50	20.63	9.71	11.49	22.88	18.07	19.05	17.83	24.02	23.66
% of prim. schools with teacher guides	84.12	89.84	89.41	89.37	88.24	83.36	89.03	87.32	85.39	87.73	90.27	89.86
% of female teachers	29.02	24.88	35.06	38.51	30.27	28.67	36.27	41.25	38.77	33.64	39.83	45.26
% of teachers with prim. school (ref.)	15.91	21.69	8.05	6.91	15.87	16.57	9.13	4.66	6.24	11.49	8.08	3.68
% of teachers with LSS	70.37	64.62	77.15	76.59	69.90	69.32	76.07	76.77	78.19	73.94	75.72	77.04
% of teachers with USS +	13.72	13.69	14.80	16.49	14.23	14.11	14.80	18.58	15.57	14.56	16.20	19.28

Notes: Categories (1), (2), (3) and (4) refer to idle, work only, school and work and school only, respectively. Ref. refers to reference category.

The empirical model

This empirical model is based on the theoretical framework discussed in Chapter 3. One can assume that time spent in each activity is linearly related to a vector of child, parental, household, and community characteristics (including the supply and quality of school inputs) representing the factors outlined previously. Some of these characteristics can be observed and measured, and thus examined as individual factors, while others cannot. One can, however, control for these unobserved characteristics as a group.

Since time spent in school is not observed, all continuous time variables are treated as latent variables whose observational counterpart is whether or not the child participates in a given activity. In addition, since this report focuses on work that may potentially interfere with schooling, the work variables are further redefined using the 14-hour cutoff. With this characterization, all children in the sample fall into one of the mutually-exclusive school-work categories of Figures 11-12. The interrelated nature of school and work decisions are accounted for by estimating jointly the determinants of current participation in school, productive work, and domestic work.[84] Using this model, one can then examine the relationship between school and work activities (and make indirect inferences about their degree of substitution) by noting how different observable and unobservable characteristics covary with child work and schooling. Finally, the model is estimated for boys and girls separately, as well as by age cohort (6-11, 12-14, and 15-17), in order to allow for structural differences in these relationships by gender and age. Gender differences in time allocation patterns may arise as a result of various factors, including:

- cultural norms that determine how labor is divided within the household along gender lines;
- cultural norms around the age at which males and females are expected to marry, and the value of each sex's education in the marriage market;
- the different parental preferences determining the education of boys and girls; and
- different private returns to education.

Model covariates

Child characteristics include the age and sex of the child, and the relationship with the household head (son or daughter versus other).

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[84] In technical terms, the model being estimated is a trivariate probit where the unobservable characteristics in the school and work equations are assumed to be jointly normally distributed.

Parental characteristics include the mother's and father's years of schooling. Household level variables include:

- sex of the household head (female versus male);
- household ethnicity (Khmer versus other);
- household wealth, as derived from an asset-based index and enters as a set of wealth quintile indicators;
- main economic activity of the household: own farm business, own non-farm business, regular employment, casual employment, or rents (pensions, dividends, interests, property rent etc.); and
- household age and sex composition: number of children aged 0-5, number of other children aged 6-14, and aged 15-17 in the household by sex, number of adults aged 18-59 by sex, and number of older people (aged 60+).

Community characteristics are represented by variables indicating the socio-economic status as well as the supply and quality of school inputs in the commune, using the WFP poverty data and EMIS data for the same academic year as the CCLS data, i.e. 2000-01.[85] To avoid over-specifying the model, a parsimonious specification for this set of variables was identified. These include:

- an indicator for urban area (versus rural);
- the WFP poverty measure;
- availability of lower secondary schools;
- the number of primary schools per 1000 population in the commune;[86] and
- characteristics of primary schools in the commune:
  - o percentage of incomplete schools;
  - o percentage of schools with preschool facilities attached;
  - o parental association;
  - o teacher guides; and
  - o teacher characteristics, including:
    - ▪ percentage of female teachers;
    - ▪ percentage of teachers with lower secondary education completed; and
    - ▪ percentage of teachers with upper secondary or higher education completed.[87]

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[85] This is done for two reasons. First, while in almost all cases we were able to match the communes of CCLS with communes in EMIS, this was not always the case at the village level. Second, the school that a given child attends is not necessarily that listed for the village where he or she resides, particularly when villages are spread out.

[86] Population data is from the 1998 Census.

[87] We only look at the characteristics of primary schools and primary school teachers for a variety of reasons, including: (i) most children in the sample who were enrolled in school at the time of the survey were attending primary school; (ii) the characteristics of primary school are more representative of the schooling environment in the commune than those of lower secondary schools; (iii) there is

School-work correlations based on model for 6-11 children

	Observable characteristics			Unobservable characteristics		
Boys						
	School	Prod. work	Dom. work	School	Prod. work	Dom. work
School	1.00			1.00		
Prod. work	0.41	1.00		0.07 (0.07)	1.00	
Dom. work	0.41	0.82	1.00	-0.11 (0.01)	0.38 (0.00)	1.00
Girls						
School	1.00			1.00		
Prod. work	0.44	1.00		0.04 (0.25)	1.00	
Dom. work	0.31	0.80	1.00	-0.05 (0.00)	0.43 (0.00)	1.00

Notes: Correlations among unobservable characteristics are estimated as part of the model as the correlation parameters of a trivariate normal distribution. Correlations among observables characteristics are based the correlation among equation indices, that is, the linear combination of model covariates. Correlations are measured in a 0 to 1 scale. Numbers in parenthesis are probability values (p-value) corresponding to the test of the hypothesis that the correlation coefficient is 0 (i.e. the two equations in question are independent). The hypothesis that all correlation coefficients are zero is rejected at the 1 percent significance level for both males and females.

School-work correlations based on model for 12-14 children

	Observable characteristics			Unobservable characteristics		
Boys						
	School	Prod. work	Dom. work	School	Prod. work	Dom. work
School	1.00			1.00		
Prod. work	-0.33	1.00		-0.14 (0.00)	1.00	
Dom. work	-0.29	0.49	1.00	-0.07 (0.16)	0.15 (0.00)	1.00
Girls						
School	1.00			1.00		
Prod. work	-0.32	1.00		-0.15 (0.00)	1.00	
Dom. work	-0.33	0.38	1.00	-0.14 (0.00)	0.14 (0.00)	1.00

high degree of correlation between the quality of primary schools and that of lower secondary schools located in the same commune; (iv) we have already seen in the previous analysis of student outcomes at the school level that school and teacher characteristics seem to matter most at the primary level.

School-work correlations based on model for 15-17 children

	Boys					
	Observable characteristics			Unobservable characteristics		
	School	Prod. work	Dom. work	School	Prod. work	Dom. work
School	1.00			1.00		
Prod. work	-0.47	1.00		-0.20 (0.00)	1.00	
Dom. work	-0.26	0.55	1.00	-0.01 (0.75)	0.09 (0.04)	1.00
	Girls					
School	1.00			1.00		
Prod. work	-0.61	1.00		-0.32 (0.00)	1.00	
Dom. work	-0.12	0.11	1.00	-0.07 (0.11)	0.01 (0.90)	1.00

Notes: See notes to the first table in Appendix J. The hypothesis that all correlation coefficients are zero is rejected at the 1 percent significance level for both males and females.

APPENDIX K

The model estimates whether or not the child entered school at each age, starting from age 5 and continuing through age 14[88] as a function of the same covariates as before, except that household age and sex composition variables at the time the child was 6 years of age are now measured, plus indicators for possible school entry ages.[89] In addition, school entry at a given age is modeled as a function of the work status of the child at that age, for each type of work (productive and domestic). In order for work to have an effect on school entry, child work must have started before the school entry age considered.[90] Since the work status at a given age is potentially endogenous to whether the child enters school at that age, school entry and work status at each age are modeled jointly. The work equation includes the same covariates as the school entry equation, including the age indicators.[91] The model is estimated for the sample of children aged 6-17 (excluding school dropouts, for whom there is no information on school entry age) by sex and type of work separately.[92]

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[88] Five is the age at which a child is deemed at risk of entering school and 14 is the age at which a child is deemed no longer at risk of entering school.

[89] These capture the relationship between the probability of entering school and age.

[90] For example, in looking at whether a child entered at age 7, the child is considered to be working if he or she was already working at age 6.

[91] In technical terms, work and school entry as a function of work are modeled as a simultaneous probit model. Ideally, we would use information on some factor that affects work status but not school entry conditional on work. In practice, we do not have such a factor, so the identification of the impact of work on school entry relies on the non-linearity of the model. The results, however, seem to be very stable and robust, which increases our confidence in them. The model further controls for clustering at the child level.

[92] A child contributes to the estimation sample up to: (i) the age he or she entered school inclusive (if he or she entered school); (ii) his or her current age (if currently not in school and aged 14 or younger); or (iii) 14 years of age (if currently not in school and older than 14 years of age).

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Model for school and work activities by gender, 6-11 age group

	Boys						Girls					
	School		Prod. work		Dom. work		School		Prod. work		Dom. work	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Child's age	13.55	21.94	8.34	15.68	2.70	9.71	12.61	19.98	8.26	15.21	3.15	9.08
Child is offspring of hh head	-3.12	-0.75	12.67	3.62	-1.00	-0.44	7.65	1.74	6.93	1.90	2.11	0.96
Mother's years of schooling	1.92	4.97	0.25	0.71	0.23	1.25	1.63	3.87	-0.41	-1.14	-0.02	-0.09
Father's years of schooling	0.92	2.68	0.15	0.46	0.22	1.34	1.04	2.79	0.49	1.47	0.16	0.80
# of 0-5 children in hh	2.33	1.99	2.33	2.09	0.52	0.82	-2.46	-2.06	-0.99	-0.89	1.05	1.53
# of 6-14 males in hh	-3.29	-3.06	-4.06	-3.85	-2.85	-4.46	-4.01	-3.53	-0.21	-0.20	-1.23	-1.73
# of 6-14 females in hh	-1.97	-1.74	-2.12	-1.86	-1.22	-2.07	-1.43	-1.24	-0.26	-0.23	-1.23	-1.69
# of 15-17 males in hh	1.33	0.70	-4.42	-2.39	-2.22	-2.14	-3.34	-1.63	-7.62	-3.95	-2.58	-2.08
# of 15-17 females in hh	6.06	3.15	-3.65	-2.02	-2.94	-2.48	-1.59	-0.77	-4.30	-2.28	-6.02	-4.63
# of 18-59 males in hh	1.21	0.85	-0.85	-0.65	0.64	0.92	0.35	0.25	-0.52	-0.39	1.87	2.51
# of 18-59 females in hh	0.95	0.71	0.41	0.31	-1.95	-2.92	1.25	0.89	0.54	0.41	-1.58	-1.83
# of 60+ individuals in hh	1.79	0.77	-0.79	-0.36	-2.37	-1.94	1.42	0.59	1.03	0.45	-0.80	-0.54
Female household head	-7.92	-1.44	-2.73	-0.56	1.62	0.59	5.12	1.01	-8.02	-1.81	2.78	0.97
Khmer	18.59	4.25	3.73	0.91	5.76	3.78	19.04	3.87	8.45	2.00	4.36	2.00
HH in 2nd wealth quintile	-3.90	-1.45	-1.41	-0.54	0.21	0.13	3.48	1.33	-1.92	-0.71	-2.67	-1.80
HH in 3rd wealth quintile	5.00	1.96	-1.14	-0.43	1.80	1.17	5.56	2.03	-0.05	-0.02	0.31	0.18
HH in 4th wealth quintile	11.73	4.48	2.57	0.94	2.94	1.84	10.78	4.10	2.76	0.97	0.98	0.57
HH in richest wealth quintile	12.93	4.65	-7.57	-2.55	-2.89	-2.05	16.01	5.82	-3.50	-1.13	-2.43	-1.47
HH main activity: non-farm business	-0.52	-0.23	-6.31	-3.08	-0.74	-0.64	1.92	0.85	-7.49	-3.65	-1.84	-1.42
HH main activity: casual employment	-12.06	-3.00	-9.36	-2.67	-0.54	-0.25	-4.95	-1.19	-9.22	-2.44	0.44	0.17
HH main activity: regular employment	9.01	3.04	-11.58	-3.88	-3.79	-2.93	1.85	0.54	-13.24	-4.55	-2.98	-1.68
HH main activity: rents	9.76	1.76	-12.10	-1.73	-1.33	-0.33	5.51	0.81	-9.26	-1.37	-0.95	-0.27
Urban	-2.92	-1.47	-6.23	-3.37	3.06	2.85	-1.83	-0.88	-3.46	-1.81	3.20	2.77
Commune poverty rate (%)	-0.11	-2.31	0.09	1.89	0.05	2.00	-0.06	-1.21	0.21	4.11	0.10	3.50
LSS in the commune	1.77	0.93	5.40	2.88	4.78	4.51	1.19	0.60	5.99	3.18	2.52	2.17
Prim. schools per 1,000 population	-0.65	-0.16	8.98	2.43	0.33	0.18	5.27	1.36	9.20	2.49	2.45	1.31
% of incomplete prim. schools	-0.05	-1.38	-0.29	-7.29	-0.07	-3.64	-0.07	-1.71	-0.22	-5.15	-0.14	-6.27
% of prim. schools with PA	0.02	0.69	-0.19	-6.32	-0.10	-3.68	0.05	1.58	-0.14	-4.81	-0.08	-4.57
% of prim. schools with preschool	0.00	0.12	0.05	1.62	-0.06	1.64	-0.02	-0.52	0.03	1.11	0.03	1.77
% of prim. schools with teacher guides	0.07	1.61	0.04	0.95	0.07	2.81	0.06	1.42	0.11	2.61	0.04	1.50
% of female teachers	0.04	0.67	-0.12	-2.16	-0.09	-2.77	0.14	2.41	-0.09	-1.58	-0.09	-2.87
% of teachers with LSS	0.27	5.05	-0.15	-2.82	-0.11	-4.10	0.31	5.62	-0.14	-2.49	-0.13	-4.35
% of teachers with USS or higher	0.26	3.31	-0.17	-2.27	-0.14	-3.44	0.24	2.82	-0.03	-0.42	-0.15	-3.03
Wald statistic model significance (p-value)	1468.2 (0.000)						1354.4 (0.000)					

Model for school and work activities by gender, 12-14 age group

	Boys						Girls					
	School		Prod. work		Dom. work		School		Prod. work		Dom. work	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Child's age	-1.90	-2.05	5.15	3.16	5.74	4.71	-8.85	-7.57	5.27	3.17	5.01	3.54
Child is offspring of hh head	11.72	2.75	4.68	0.78	-3.83	-0.78	8.59	1.83	9.82	1.53	3.77	0.71
Mother's years of schooling	1.94	4.53	0.05	0.10	0.69	1.74	0.92	2.24	-0.52	-0.99	0.71	1.47
Father's years of schooling	0.57	1.73	0.23	0.48	-0.49	-1.29	0.55	1.55	-0.48	-0.99	0.60	1.36
# of 0-5 children in hh	-0.36	-0.33	1.91	0.98	-1.99	-1.34	-1.44	-1.22	-0.77	-0.37	1.33	0.78
# of 6-14 males in hh	-0.23	-0.25	2.46	1.54	-0.36	-0.29	-2.64	-2.36	1.78	1.07	-2.66	-1.82
# of 6-14 females in hh	-1.75	-1.98	2.75	1.64	2.15	1.67	-0.08	-0.07	3.54	2.04	0.58	0.38
# of 15-17 males in hh	-1.03	-0.69	-5.63	-2.26	-4.60	-2.25	-1.60	-0.96	-3.79	-1.48	-3.19	-1.35
# of 15-17 females in hh	1.44	0.89	-5.90	-2.29	-0.76	-0.39	2.23	1.25	-3.96	-1.49	-8.72	-3.44
# of 18-59 males in hh	0.60	0.55	-4.15	-2.39	-2.95	-2.17	2.81	2.34	-1.73	-0.99	0.56	0.35
# of 18-59 females in hh	0.96	1.03	1.15	0.70	-1.73	-1.27	1.42	1.28	-1.44	-0.88	-1.45	-0.93
# of 60+ individuals in hh	0.82	0.47	0.23	0.07	-1.95	-0.74	3.02	1.38	5.33	1.61	1.68	0.58
Female household head	-4.24	0.85	-8.98	-1.24	4.87	0.86	-1.93	-0.38	-0.65	-0.08	6.89	0.96
Khmer	17.47	3.88	1.14	0.16	9.72	2.25	13.78	2.80	4.96	0.64	8.53	1.47
HH in 2nd wealth quintile	2.09	0.99	-4.36	-0.99	0.11	0.03	-2.00	-0.74	-2.62	-0.58	0.27	0.07
HH in 3rd wealth quintile	3.52	1.71	-3.37	-0.77	2.72	0.80	4.55	1.83	1.74	0.40	1.32	0.35
HH in 4th wealth quintile	7.06	3.53	1.44	0.33	-2.62	-0.83	4.21	1.58	0.99	0.22	-0.55	-0.14
HH in richest wealth quintile	7.97	3.56	-9.21	-1.95	-8.61	-2.60	5.36	1.87	-5.31	-1.10	-7.73	-1.77
HH main activity: non-farm business	-3.35	-1.68	-13.42	-3.99	-3.07	-1.21	-6.94	-2.70	-10.26	-2.91	-0.02	-0.01
HH main activity: casual employment	-11.22	-2.85	-21.60	-3.44	-12.27	-2.77	-19.02	-3.91	-18.60	-2.76	0.03	0.00
HH main activity: regular employment	1.53	0.51	-20.25	-4.30	-9.71	-2.96	0.93	0.24	-7.95	-1.68	-3.56	-0.77
HH main activity: rents	1.72	0.26	-19.25	-2.14	0.17	0.02	7.64	1.40	-11.18	-1.01	5.20	0.75
Urban	0.58	0.35	-9.27	-2.87	6.61	2.62	-0.25	-0.12	-9.63	-3.07	4.28	1.60
Commune poverty rate (%)	-0.10	-2.33	0.29	3.66	0.07	1.23	-0.09	-1.85	-0.04	-0.44	0.01	0.11
LSS in the commune	2.84	1.82	10.42	3.71	12.72	5.66	3.26	1.69	4.87	1.71	3.96	1.56
Prim. schools per 1,000 population	-5.16	-1.74	1.81	0.29	0.59	0.13	0.78	0.21	4.18	0.66	2.47	0.50
% of incomplete prim. schools	0.04	1.21	-0.21	-3.40	-0.14	-3.27	-0.01	-0.37	-0.26	-4.13	-0.09	-1.79
% of prim. schools with PA	0.02	0.78	-0.14	-2.81	-0.11	-2.89	0.07	2.10	-0.03	-0.55	-0.17	-4.19
% of prim. schools with preschool	-0.01	-0.22	0.10	2.16	-0.07	-1.90	0.12	2.94	0.08	1.69	0.06	1.44
% of prim. schools with teacher guides	0.04	1.25	0.11	1.52	0.03	0.60	-0.03	-0.71	-0.06	-0.90	0.06	0.91
% of female teachers	-0.01	-0.12	-0.19	-2.31	-0.04	-0.57	0.10	1.74	-0.15	-1.71	-0.09	-1.21
% of teachers with LSS	0.10	2.38	-0.12	-1.38	-0.38	-5.76	0.09	1.81	-0.37	-3.68	-0.38	-4.90
% of teachers with USS or higher	-0.01	-0.14	-0.09	-0.76	-0.26	-2.86	0.05	0.59	-0.51	-3.76	-0.21	-1.89
Wald statistic model significance (p-value)	674.4 (0.000)						593.7 (0.000)					

Model for school and work activities by gender, 15-17 age group

	Boys						Girls					
	School		Prod. work		Dom. work		School		Prod. Work		Dom. work	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Child's age	-15.00	-9.11	4.24	3.10	2.66	1.47	-16.08	-9.33	4.06	3.11	2.86	1.69
Child is offspring of hh head	6.67	1.18	1.52	0.32	3.88	0.82	17.98	3.55	-1.57	0.39	0.97	0.20
Mother's years of schooling	0.95	1.66	-0.26	-0.63	0.55	1.10	2.32	4.12	-1.44	-3.50	0.57	1.06
Father's years of schooling	1.01	2.03	-0.26	-0.65	0.63	1.39	0.77	1.47	0.32	0.87	-0.06	-0.11
# of 0-5 children in hh	-1.05	-0.50	1.19	0.62	1.93	1.01	-3.67	-1.65	0.23	0.13	0.16	0.08
# of 6-14 males in hh	-2.53	-1.67	-2.73	-1.69	-1.17	-0.84	-1.66	-1.02	-1.49	-1.17	-0.44	-0.28
# of 6-14 females in hh	-1.05	-0.68	-1.03	-0.76	-0.33	-0.23	-3.78	-2.27	-1.45	2.10	0.33	0.19
# of 15-17 males in hh	3.09	0.96	1.39	0.50	-2.75	-0.92	2.50	0.73	2.74	-0.88	-5.14	-1.47
# of 15-17 females in hh	-5.99	-1.66	-1.37	-0.48	-4.02	-1.25	2.41	0.69	-2.33	0.53	-11.37	-3.17
# of 18-59 males in hh	2.84	1.65	-1.41	-1.03	1.77	1.18	3.20	1.96	1.56	0.57	1.43	0.88
# of 18-59 females in hh	3.74	2.29	-2.05	-1.53	0.68	0.44	3.66	2.23	-0.72	-3.48	-0.54	-0.33
# of 60+ individuals in hh	6.65	2.21	-3.62	-1.40	3.95	1.44	11.80	3.88	-4.30	-2.15	3.10	1.05
Female household head	2.56	0.32	1.26	0.20	-2.36	-0.30	-9.14	-1.16	-2.25	-0.36	6.40	0.84
Khmer	-1.17	-0.17	-2.95	-0.48	12.96	1.92	2.71	0.35	-5.43	-0.97	8.56	1.14
HH in 2nd wealth quintile	2.18	0.47	-4.02	-0.96	0.82	0.19	-5.83	1.16	-2.33	-0.58	1.08	0.22
HH in 3rd wealth quintile	10.20	2.38	3.29	0.85	-0.20	-0.05	1.56	0.31	0.03	0.01	-5.99	-1.23
HH in 4th wealth quintile	13.68	3.26	0.15	0.04	-9.50	-2.49	1.96	0.41	4.84	1.33	0.08	0.02
HH in richest wealth quintile	18.63	4.12	-2.82	-0.68	-12.81	-3.12	16.58	3.16	-4.64	-1.16	-4.48	-0.87
HH main activity: non-farm business	-0.21	-0.06	-7.98	-2.66	-5.12	-1.66	-1.93	-0.54	-8.01	-2.69	0.94	0.26
HH main activity: casual employment	-29.10	-3.80	-10.19	-1.62	-11.62	-2.05	-17.24	-2.29	-14.18	-2.34	-7.29	-1.08
HH main activity: regular employment	5.81	1.14	-14.94	-3.31	-12.59	-3.04	-9.18	-2.01	-7.61	-2.08	-3.67	-0.73
HH main activity: rents	10.20	1.31	-16.63	-2.40	-3.31	-0.44	5.53	0.57	-16.70	-2.19	1.83	0.22
Urban	1.36	0.41	-10.34	-3.56	5.63	1.82	-2.04	-0.58	-7.59	-2.72	-2.30	-0.67
Commune poverty rate (%)	0.12	1.47	-0.11	1.47	0.15	2.09	-0.12	-1.48	-0.07	-0.99	-0.01	-0.07
LSS in the commune	2.15	0.76	7.50	3.22	7.58	2.87	6.32	2.11	2.12	0.93	9.80	3.28
Prim. schools per 1,000 population	6.86	1.06	3.71	0.68	-1.59	-0.29	9.49	1.38	-9.65	-1.79	0.01	0.00
% of incomplete prim. schools	-0.20	-3.01	-0.12	-2.19	-0.15	-2.55	-0.08	-1.22	-0.14	-2.56	-0.10	-1.52
% of prim. schools with PA	0.04	0.78	-0.10	-2.43	-0.12	-2.63	-0.08	-1.68	0.01	0.34	-0.12	-2.57
% of prim. schools with preschool	-0.07	-1.42	0.05	1.34	-0.00	-0.03	0.10	2.02	-0.04	-1.23	-0.17	-3.44
% of prim. schools with teacher guides	0.05	0.72	-0.21	-3.18	0.03	0.38	0.01	0.11	-0.05	-0.76	0.14	1.87
% of female teachers	0.04	0.53	-0.01	-0.10	-0.17	-2.23	0.05	0.55	-0.14	-2.05	-0.12	-1.29
% of teachers with LSS	0.18	1.74	-0.34	-3.50	-0.41	-4.34	0.04	0.40	-0.02	-0.30	-0.49	-4.93
% of teachers with USS or higher	-0.08	-0.60	-0.32	-2.66	-0.25	-2.00	0.11	0.85	-0.14	-1.30	-0.23	-1.68
Wald statistic model significance (p-value)	543.3 (0.000)						540.6 (0.000)					

APPENDIX O

Methods differ in how they address this missing "counterfactual." The approach taken in the ESSP reviews for 2002 and 2003 is to compare education outcomes before and after the programs or, more generally, the trends in those outcomes as the programs unfold. This approach has three main problems. First, there is no attempt to isolate the effect of school grants from that of remedial classes. Second, the removal of school fees and the compensating school grants are two different interventions (i.e. the former affects education outcomes by altering the demand for schooling while the latter works through the supply). In fact, if school fees had been replaced perfectly by school grants, there would not have been any supply effect. In practice, however, school grants did not perfectly match previously charged fees, and schools did not have the same degree of autonomy over resources, so school grants are likely to have an independent (supply) effect. Third, and most important, even if the sole interest is the combined impact of all these interventions, other things changed during the implementation of these programs that could have affected the education outcomes of interest. As a result, attributing all the before and after changes in education outcomes to these program is likely to overestimate the true impact of these programs.

APPENDIX P

If the question of work versus school entry is temporarily ignored and the focus is solely on school, one can estimate a school entry age model that uses all available information pertaining to school dropouts. In relation to school dropouts, data shows at what age children entered school, their current age, and the number of grades they attended. The data do not, however, record the age at which they quit school. Thus, it is certain that these children entered school somewhere between the ages of 5 and the difference between their current age and the number of grades attended. This is the information used on school dropouts for estimating the school entry age model.

In technical terms, the model being estimated is an interval regression tobit model. As in the previous model, all children are assumed to become at risk of entering school at age 5. However, in contrast with the previous model (where school entry is treated as a discrete variable), school entry age is treated as a continuous process. Likewise, for the sake of simplicity, no upper limit to risk of entering school is defined so that children that have not entered school by the time of the survey have a non-zero probability of entering school at an age greater than their current age.

The estimation results are reported in the table below and are very similar to those from the earlier model for school entry. The results from this model are reported given the key importance of this variable in the Cambodian context and the fact that, in contrast with the earlier model, here all the available information on school entry age from all children are used. The reported coefficients measure the percentage change (on a 0 to 100 scale) in school entry age resulting from a one-unit increase in the explanatory variable (for continuous variables) or being in a given category versus being in the reference category (for indicator variables). These marginal effects are evaluated at the means of the covariates. Highlighted coefficients are statistically significant at the 5 percent level or less.

Model for school entry age for 6-17 aged children, by sex

	Boys		Girls	
	Coeff.	t-ratio	Coeff.	t-ratio
Child's age	1.65	16.01	2.23	18.90
Child is offspring of hh head	-4.32	-2.48	-5.38	-2.86
Mother's years of schooling	-1.22	-10.17	-1.11	-9.32
Father's years of schooling	-0.50	-4.22	-0.80	-6.91
# of 0-5 children in hh	-0.11	-0.29	0.01	0.03
# of 6-14 males in hh	0.42	1.14	0.49	1.13
# of 6-14 females in hh	-0.23	-0.63	-0.21	-0.52
# of 15-17 males in hh	-1.03	-1.31	-0.74	-0.88
# of 15-17 females in hh	-0.37	-0.47	0.17	0.19
# of 18-59 males in hh	-1.72	-2.83	-1.50	-2.36
# of 18-59 females in hh	-0.85	-1.33	-1.71	-2.70
# of 60+ individuals in hh	-1.31	-1.63	-1.75	-2.06
Female household head	3.66	1.64	3.12	1.68
Khmer	-12.91	-6.07	-13.27	-5.35
HH in 2nd wealth quintile	0.13	0.11	0.09	0.07
HH in 3rd wealth quintile	-3.62	-3.26	-5.48	-4.62
HH in 4th wealth quintile	-8.48	-8.10	-9.04	-7.90
HH in richest wealth quintile	-11.33	10.61	-11.66	10.28
HH main activity: non-farm business	0.63	0.77	-0.16	-0.19
HH main activity: casual employment	9.10	4.50	7.19	3.85
HH main activity: regular employment	-3.23	-3.07	0.07	0.05
HH main activity: rents	-0.88	-0.57	-2.71	-1.13
Urban	-2.01	-2.83	0.15	0.20
Commune poverty rate (%)	0.07	3.26	0.08	3.28
LSS in the commune	0.14	0.22	-1.66	-2.46
Prim. schools per 1,000 population	-2.58	-1.33	-5.97	-2.90
% of incomplete prim. schools	0.03	1.66	0.04	2.19
% of prim. schools with PA	-0.06	-4.99	-0.05	-4.53
% of prim. schools with preschool	-0.04	-3.41	-0.03	-2.87
% of prim. schools with teacher guides	-0.04	-2.31	-0.03	-1.38
% of female teachers	-0.02	-0.80	-0.09	-4.05
% of teachers with LSS	-0.20	-6.87	-0.27	-7.37
% of teachers with USS or higher	-0.18	-5.31	-0.31	-7.40
Wald statistic model significance (p-value)	1430.9 (0.000)		1384.2 (0.000)	

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In order to evaluate the overall impact of the project, one must distinguish between two dimensions of the project: the education services provided and the mechanism used to deliver these services. In relation to the latter, EQIP used a decentralized and participatory model for making determinations about the usage of school level grants. In practice, however, it is not possible to quantitatively distinguish between the two in the present context. There is complementary qualitative evidence, however, indicating that both dimensions were positively assessed by project beneficiaries (see Geeves, et al., 2002). International evidence also supports the benefits of increased school autonomy and parental involvement in school matters (Eskeland and Filmer, 2002, King and Özler, 2000; Jimenez and Sawada, 1999). It also shows that the effectiveness of school grants programs is increased when the role of schools and local communities is emphasized and supported (Roberts-Schweitzer et al, 2002).

Marshall considers two types of treatment variables to evaluate the overall impact of school grants:

- whether a school or cluster participated in EQIP at a given point in time, and
- the number of years it had been in the project by the time of participation in EQIP.

The treatment variable for the evaluation of the relative cost-effectiveness of different types of quality investments is the money spent per pupil on various quality investments.

The evaluation strategy exploits the fact that the project was phased in, which allows for an evaluation based on the sample of schools or clusters that eventually participated in EQIP. In particular, the project began in 1998-99 with 10 clusters in Takeo that were, according to EQIP personnel, selected on the basis of being centrally located within the province. The program then expanded to the rest of Takeo in the 1999-2000 school year and then to the two remaining provinces for 2000-2001, beginning first in those districts that border Takeo. This of course does not mean that there were no pre-project differences between the clusters that entered the project the earliest in each province compared with the remaining participants, or between schools or clusters across the three provinces. To the extent that these differences exist, a simple comparison of mean education outcomes by years of participation in EQIP, for example, would yield a biased estimate of the true impact of each additional year in EQIP. This was controlled by examining variation within a given province and by controlling for differences in pre-project school characteristics using EMIS 1998-99 as well as differences in 1999 commune poverty rates (from WFP). Data on student flows are also from EMIS 1999-2003. Data on test scores for numeracy and literacy of fourth graders, as well as

administrative data on expenditures on different quality improvements, were collected as part of EQIP.[93]

The evaluation method used by Marshall is then utilized to regress student flows and test scores at the school or cluster levels (and grade, in the case of student flows) at each point in time during the life of the project (i.e. 1999-2003). This was done on different specifications of the EQIP "treatment," controlling for school characteristics and commune-level poverty in 1998-99, as well as on province, school year, and grade-specific effects.

Before presenting the impact evaluation results, it is worth looking at other dimensions of the performance of the project in terms of intermediate outcomes, namely:

- the size of EQIP grants actually received, and
- the manner in which they were used by the schools.

Except during the pilot year, EQIP school clusters received, on average, slightly less than two dollars per student per year, which was the target set by EQIP. This is a significant amount if looked at relative to the cost of living in Cambodia and average annual public expenditure in Cambodia ($10). In addition, the EQIP project delivered the money in a timely fashion (Geeves, et al., 2002).

Cluster schools generally used the money to finance a range of interventions. Teacher development captured as much as 57 percent (in year 2) of the total spending, and this category is consistently the largest budget item. Teacher development involves hiring trainers to provide classes, providing materials for these training sessions, supervising the training, and providing teachers with cash "incentives" to attend. Pupil learning materials, libraries, and equipment are the other main investment items using EQIP grant funds. For equipment, the overall expenditures declined with time and appear to have been replaced by increases in remedial classes and student health expenditures.

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[93] The fact that schools could decide how to invest the EQIP grant raises concerns about the endogeneity of the allocation of the grant as a treatment variable. In particular, some of the observed differences in student outcomes between schools with different expenditure patterns could be due to differences in the factors that lead to these expenditure patterns. Some of these factors are controlled for (e.g. pre-project school characteristics) but others are not (composition of the school cluster committees).

APPENDIX R

The analysis will take two approaches. The first will make use of the data from all scholarship application forms, combined with data on applicants' school progress. It will exploit the variation generated by the combination of a fixed number of scholarships per schools and a varying number and quality of applicants in each school, which results in children with the same observable characteristics receiving the scholarship if they applied to some schools but not to others. The second approach will make use of EMIS school-level data on enrollment (as well as promotion and repetition) over time and exploit the fact that in 75 schools, only girls got scholarships. In particular, the impact of the program after a year is estimated as the differences over two consecutive years (2003-04 and 2004-05) in the girl-to-boy promotion (to 8th grade and to 9th grade, separately) between schools that received JFPR scholarships and schools that did not.

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